

=> fil reg

FILE 'REGISTRY' ENTERED AT 17:21:50 ON 30 AUG 2006  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
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(FILE 'HOME' ENTERED AT 08:19:40 ON 30 AUG 2006)  
D SAV

FILE 'REGISTRY' ENTERED AT 08:20:48 ON 30 AUG 2006  
ACT WEI272S/A

```
-----
L1      SCR 1918
L2      SCR 1841
L3      SCR 1968 OR 1958 OR 1938 OR 1985
L4      STR
L5      49 SEA SSS SAM L4 NOT (L1 OR L2 OR L3)
-----

L6      STR L4
L7      STR
L8      42 SEA SSS SAM (L6 NOT L7) NOT (L1 OR L2 OR L3)
L9      SCR 1312 OR 1707 OR 1526
L10     36 SEA SSS SAM (L6 NOT L7) NOT (L1 OR L2 OR L3 OR L9)
L11     STR
L12     33 SEA SSS SAM (L6 NOT L7 NOT L11) NOT (L1 OR L2 OR L3 OR
L13     SCR 2026
L14     31 SEA SSS SAM (L6 NOT L7 NOT L11) NOT (L1 OR L2 OR L3 OR
L15     STR
L16     30 SEA SSS SAM (L6 NOT L7 NOT L11 NOT L15) NOT (L1 OR L2 OR
L17     STR
L18     30 SEA SSS SAM (L6 NOT L7 NOT L11 NOT L15 NOT L17) NOT (L1
L19     SCR 1267
L20     25 SEA SSS SAM (L6 NOT L7 NOT L11 NOT L15 NOT L17) NOT (L1
L21     STR L6
L22     20 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17) NOT (L1
L23     SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043
L24     STR
L25     STR L24
L26     SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445
L27     28 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25)
L28     SCR 1199 OR 2016 OR 1481
L29     28 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25)
L30     STR
L31     26 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25
L32     SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108
L33     28 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25

```

OR L26 OR L28 OR L32)  
L34 STR  
L35 19 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
OR L23 OR L26 OR L28 OR L32)  
L36 SCR 2040  
L37 14 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
OR L23 OR L26 OR L28 OR L32 OR L36)  
L38 SCR 1116 OR 1257  
L39 20 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
OR L23 OR L26 OR L28 OR L32 OR L38)  
L40 20 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
OR L23 OR L26 OR L28 OR L32 OR L38 OR L36)  
L41 9897 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
OR L23 OR L26 OR L28 OR L32 OR L38 OR L36)  
SAV L41 WEI272F26/A

FILE 'HCAPLUS' ENTERED AT 12:55:45 ON 30 AUG 2006

E US20040185347/PN  
L42 1 SEA US2004185347/PN

FILE 'REGISTRY' ENTERED AT 12:56:30 ON 30 AUG 2006

L43 54 SEA (463-79-6/BI OR 10377-51-2/BI OR 105-58-8/BI OR

L44 5 SEA L43 AND L41

ACT WEI272F1/A

-----  
L45 STR  
L46 SCR 2043  
L47 SCR 1064  
L48 37681 SEA SSS FUL L45 AND L47 NOT L46

-----  
L49 1 SEA L43 AND L48

L50 STR  
L51 STR  
L52 1 SEA SSS SAM L50  
L53 50 SEA SSS SAM L51  
L54 SCR 1840  
L55 STR L51  
L56 50 SEA SSS SAM L55 NOT L54  
L57 STR L50  
L58 12332 SEA SSS FUL L55 NOT L54  
SAV L58 WEI272F45/A  
L59 STR L50  
L60 50 SEA SSS SAM L59  
L61 50 SEA SSS SAM L59 NOT L54  
L62 50 SEA SSS SAM (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L3)  
L63 50 SEA SSS SAM (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L3  
OR L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR L38  
OR L36)  
L64 50 SEA SSS SAM (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L1  
OR L3 OR L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR  
L38 OR L36)  
L65 1699 SEA SSS FUL (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L1

OR L3 OR L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR  
L38 OR L36)  
SAV L65 WEI272F3/A  
L66 STR  
L67 50 SEA SUB=L48 SSS SAM (L66 NOT L54)  
L68 1222 SEA SUB=L48 SSS FUL (L66 NOT L54)  
L69 1 SEA L43 AND L68  
SAV WEI272F1S/A L68  
L70 STR L21  
L71 50 SEA SUB=L41 SSS SAM L70  
L72 2634 SEA SUB=L41 SSS FUL L70  
SAV L72 WEI272F2S/A  
L73 STR L21  
L74 50 SEA SUB=L41 SSS SAM L73  
L75 2262 SEA SUB=L41 SSS FUL L73  
SAV L75 WEI272F6S/A  
L76 4 SEA L43 AND L72  
L77 1 SEA L43 AND L75  
L78 3 SEA L43 AND L65  
L79 STR L55  
L80 STR L79  
L81 17 SEA SUB=L58 SSS SAM L80  
L82 288 SEA SUB=L58 SSS FUL L80  
SAV L82 WEI272F4S/A  
L83 2 SEA L43 AND L82  
L84 STR L55  
L85 1 SEA SUB=L58 SSS SAM L84  
L86 58 SEA SUB=L58 SSS FUL L84  
SAV L86 WEI272F5S/A  
L87 2 SEA L43 AND L86  
L88 928 SEA L68 AND 1/NC  
L89 2570 SEA L72 AND 1/NC  
L90 1698 SEA L65 AND 1/NC  
L91 123 SEA L82 AND 1/NC  
L92 25 SEA L86 AND 1/NC  
L93 2221 SEA L75 AND 1/NC

*Formula*

1  
2  
3  
4  
5  
6

FILE 'HCAPLUS' ENTERED AT 16:21:21 ON 30 AUG 2006

L94 17472 SEA L88  
L95 40827 SEA L89  
L96 8170 SEA L90  
L97 6839 SEA L91  
L98 1201 SEA L92  
L99 27264 SEA L93

FILE 'REGISTRY' ENTERED AT 16:24:10 ON 30 AUG 2006

L100 1 SEA LITHIUM/CN

FILE 'HCAPLUS' ENTERED AT 16:25:34 ON 30 AUG 2006

L101 81718 SEA L100  
L102 474811 SEA ELECTROLY?

FILE 'REGISTRY' ENTERED AT 16:41:10 ON 30 AUG 2006

L103 20881 SEA LITHIUM SALT  
L104 4 SEA L43 AND L103

FILE 'HCAPLUS' ENTERED AT 16:42:32 ON 30 AUG 2006

L105 85337 SEA L103 OR (LITHIUM OR LI) (2A) SALT#  
L106 238813 SEA BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY?  
OR GALVAN? OR WET OR DRY OR PRIMARY OR SECONDARY) (2A) (CEL

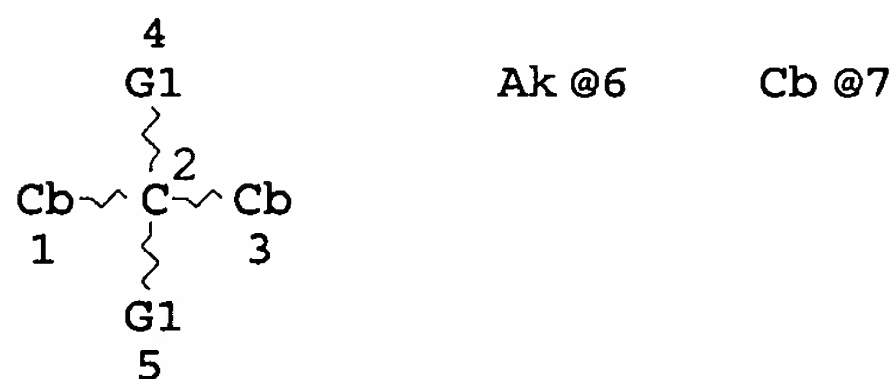
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      L OR CELLS)
L107      83 SEA L94 AND L105
L108      6 SEA L107 AND L106
L109      2 SEA L108 AND L101
L110      2 SEA L109 AND L102
L111      6 SEA L108 OR L109 OR L110
L112     708 SEA L95 AND L105
L113     99 SEA L112 AND L106
L114     45 SEA L113 AND L101
L115     40 SEA L114 AND L102
L116     37 SEA L115 AND (1840-2003)/PY,PRY,AY
L117     36 SEA L116 NOT L111
L118     70 SEA L90 AND L105
L119      6 SEA L118 AND L106
L120      2 SEA L119 AND L101
L121      2 SEA L120 AND L102
L122      6 SEA L119 OR L120 OR L121
L123      5 SEA L122 NOT (L111 OR L117)
L124     50 SEA L91 AND L105
L125      2 SEA L124 AND L106
L126      1 SEA L125 AND L101
L127      1 SEA L126 AND L102
L128      2 SEA L125 OR L126 OR L127
L129      0 SEA L128 NOT (L111 OR L117 OR L123)
L130      6 SEA L128 OR L111
L131     11 SEA L92 AND L105
L132      1 SEA L131 AND L106
L133      1 SEA L132 AND L101
L134      1 SEA L133 AND L102
L135      1 SEA L42 AND L134
L136      6 SEA L135 OR L111
L137     460 SEA L93 AND L105
L138     49 SEA L137 AND L106
L139     12 SEA L138 AND L101
L140     11 SEA L139 AND L102
L141     12 SEA L139 OR L140
L142      9 SEA L141 NOT (L136 OR L117 OR L123)

```

=> d l68 que stat

L45 STR



VAR G1=6/7

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

GGCAT IS UNS AT 1

GGCAT IS UNS AT 3

GGCAT IS SAT AT 6

GGCAT IS UNS AT 7

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS E6 C AT 1

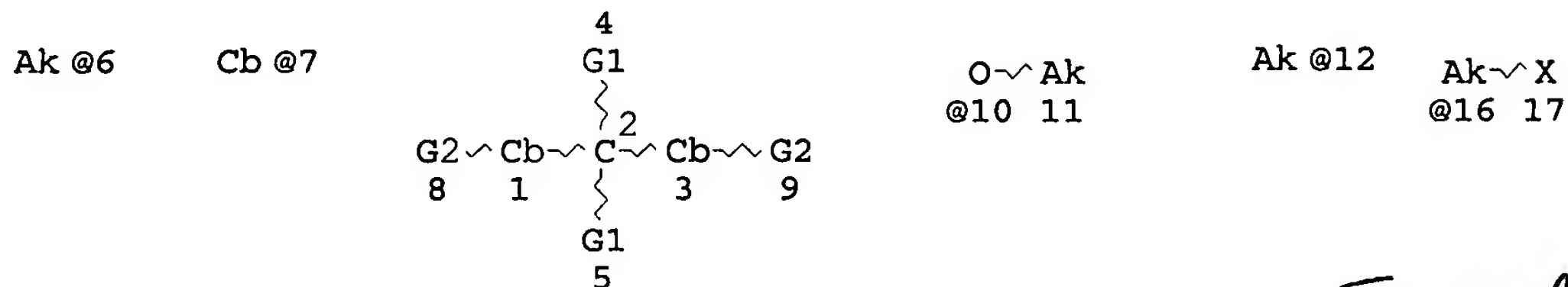


ECOUNT IS E6 C AT 3

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 7

STEREO ATTRIBUTES: NONE

L46 SCR 2043  
L47 SCR 1064  
L48 37681 SEA FILE=REGISTRY SSS FUL L45 AND L47 NOT L46  
L54 SCR 1840  
L66 STR



Formula (1)

O ~ Ak ~ X  
@13 14 15

VAR G1=6/7

VAR G2=OH/10/12/16/13

NODE ATTRIBUTES:

CONNECT IS E1 RC AT 6  
CONNECT IS E1 RC AT 7  
CONNECT IS E1 RC AT 11  
CONNECT IS E1 RC AT 12  
CONNECT IS E2 RC AT 14  
CONNECT IS E2 RC AT 16

DEFAULT MLEVEL IS ATOM

GGCAT IS UNS AT 1  
GGCAT IS UNS AT 3  
GGCAT IS SAT AT 6  
GGCAT IS UNS AT 7  
GGCAT IS SAT AT 11  
GGCAT IS UNS AT 12  
GGCAT IS SAT AT 14  
GGCAT IS UNS AT 16

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS E6 C AT 1  
ECOUNT IS E6 C AT 3

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 17

STEREO ATTRIBUTES: NONE

L68 1222 SEA FILE=REGISTRY SUB=L48 SSS FUL (L66 NOT L54)

100.0% PROCESSED 11518 ITERATIONS  
SEARCH TIME: 00.00.01

1222 ANSWERS

=> d 172 que stat

L1 SCR 1918  
L2 SCR 1841  
L3 SCR 1968 OR 1958 OR 1938 OR 1985  
L7 STR

CN 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

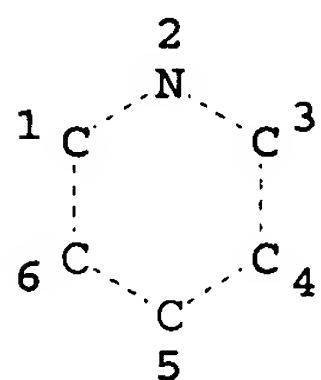
RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L9 SCR 1312 OR 1707 OR 1526

L11 STR



NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

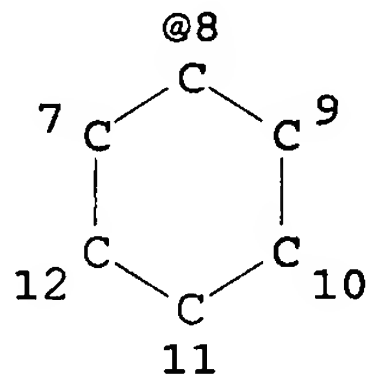
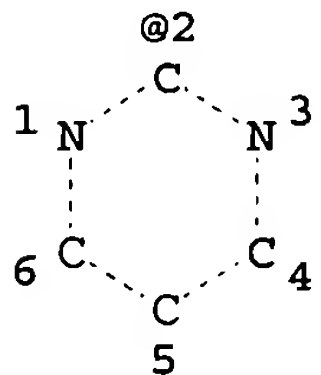
RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 6

STEREO ATTRIBUTES: NONE

L13 SCR 2026

L15 STR



G1 13

VAR G1=2/8

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

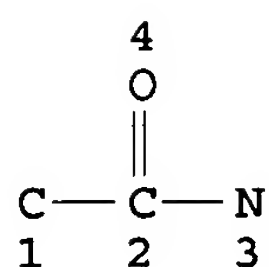
GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 13

STEREO ATTRIBUTES: NONE

L17 STR



## NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

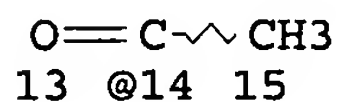
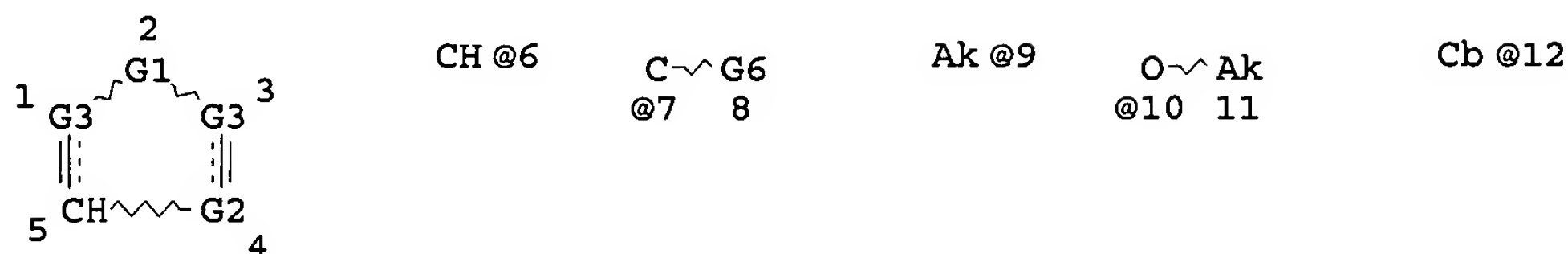
RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 4

## STEREO ATTRIBUTES: NONE

L19 SCR 1267

L21 STR



VAR G1=O/N/S

VAR G2=C/N/O/S

VAR G3=6/7

VAR G6=9/10/12/14

## NODE ATTRIBUTES:

CONNECT IS E1 RC AT 9

CONNECT IS E1 RC AT 11

CONNECT IS E1 RC AT 12

DEFAULT MLEVEL IS ATOM

GGCAT IS SAT AT 11

GGCAT IS UNS AT 12

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS M1-X8 C AT 9

ECOUNT IS M1-X6 C AT 11

## GRAPH ATTRIBUTES:

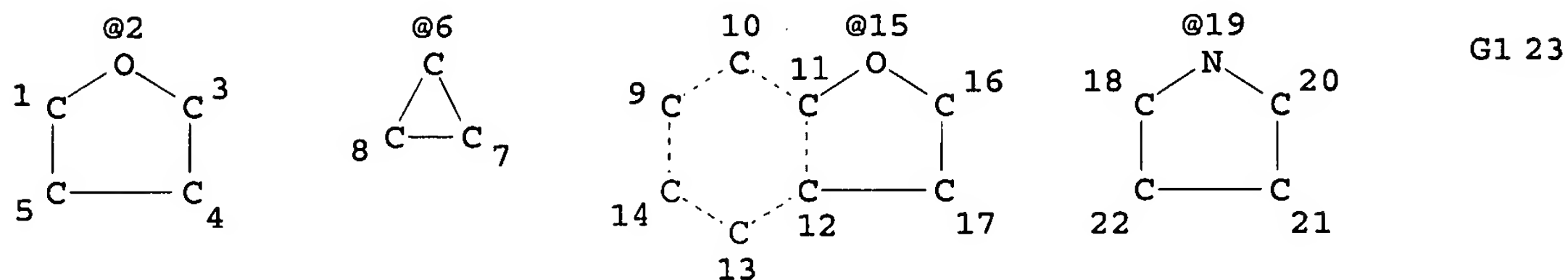
RSPEC I

NUMBER OF NODES IS 15

## STEREO ATTRIBUTES: NONE

L23 SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043

L25 STR



VAR G1=2/6/15/19

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 23

STEREO ATTRIBUTES: NONE

L26 SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445

L28 SCR 1199 OR 2016 OR 1481

L30 STR

NO2 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L32 SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108

L34 STR

OH 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

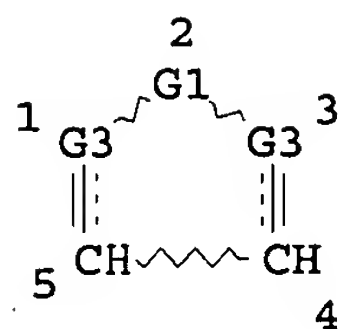
STEREO ATTRIBUTES: NONE

L36 SCR 2040

L38 SCR 1116 OR 1257

L41 9897 SEA FILE=REGISTRY SSS SAM (L21 NOT L7 NOT L11 NOT L15  
NOT L17 NOT L25 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR  
L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR L38 OR  
L36)

L70 STR



CH @6

C ~ G6  
@7 8

Ak @9

O ~ Ak  
@10 11

Cb @12

*Formula (2)*O=C ~ CH3  
13 @14 15

VAR G1=O/N/S

VAR G3=6/7

VAR G6=9/10/12/14

NODE ATTRIBUTES:

CONNECT IS E1 RC AT 9

CONNECT IS E1 RC AT 11

CONNECT IS E1 RC AT 12

DEFAULT MLEVEL IS ATOM

GGCAT IS SAT AT 11

GGCAT IS UNS AT 12

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS M1-X8 C AT 9

ECOUNT IS M1-X6 C AT 11

GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L72 2634 SEA FILE=REGISTRY SUB=L41 SSS FUL L70

100.0% PROCESSED 8903 ITERATIONS

2634 ANSWERS

SEARCH TIME: 00.00.01

=&gt; d 165 que stat

L1 SCR 1918

L3 SCR 1968 OR 1958 OR 1938 OR 1985

L7 STR

CN 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L9 SCR 1312 OR 1707 OR 1526

L13 SCR 2026

L19 SCR 1267

L23 SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043

L26 SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445  
L28 SCR 1199 OR 2016 OR 1481  
L30 STR

NO2 1

NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

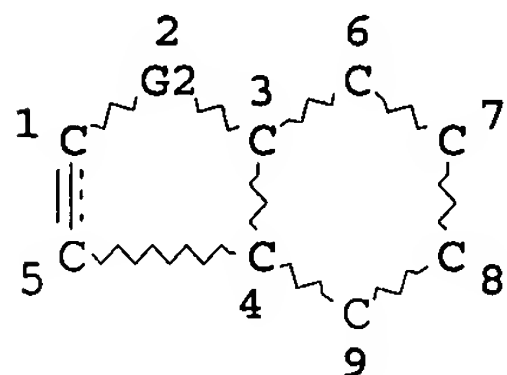
GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE  
L32 SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108  
L34 STR  
OH 1

NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE  
L36 SCR 2040  
L38 SCR 1116 OR 1257  
L54 SCR 1840  
L59 STR



Formula(3)

VAR G2=O/N/S  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RSPEC I  
NUMBER OF NODES IS 9

STEREO ATTRIBUTES: NONE  
L65 1699 SEA FILE=REGISTRY SSS FUL (L59 NOT L7 NOT L30 NOT L34)  
NOT (L54 OR L1 OR L3 OR L9 OR L13 OR L19 OR L23 OR L26  
OR L28 OR L32 OR L38 OR L36)

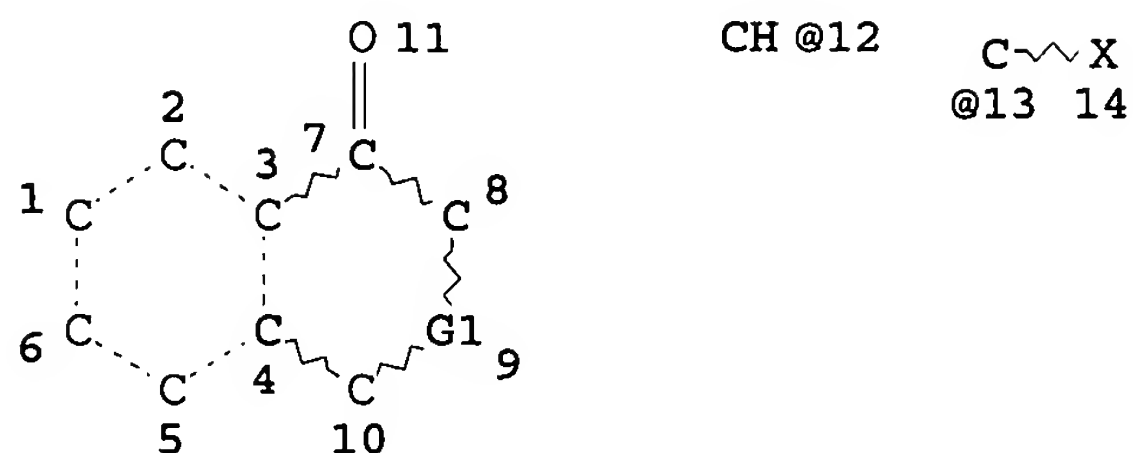
100.0% PROCESSED 7356 ITERATIONS  
SEARCH TIME: 00.00.01

1699 ANSWERS

=> d 182 que stat

L54 SCR 1840

L55 STR



VAR G1=12/13

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I

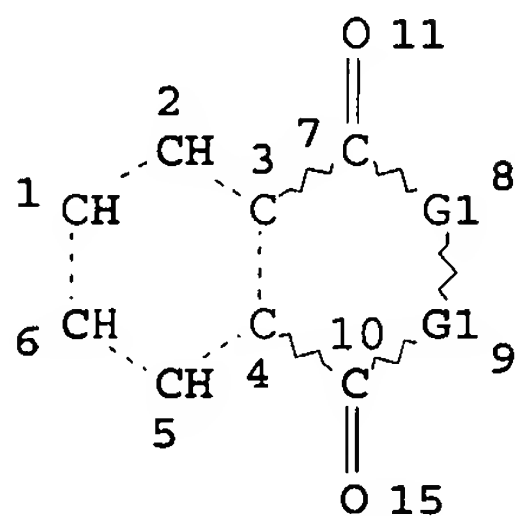
NUMBER OF NODES IS 14

STEREO ATTRIBUTES: NONE

L58 12332 SEA FILE=REGISTRY SSS FUL L55 NOT L54

L80 STR

CH @12      C~X  
              @13 14



Formula (4)

VAR G1=12/13

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L82 288 SEA FILE=REGISTRY SUB=L58 SSS FUL L80

100.0% PROCESSED 7289 ITERATIONS

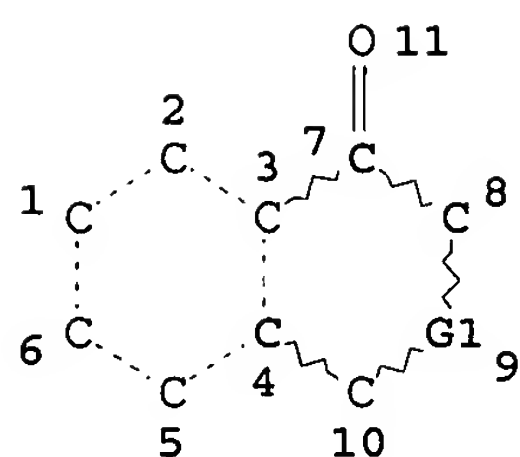
288 ANSWERS

SEARCH TIME: 00.00.01

=> d 186 que stat

L54 SCR 1840

L55 STR



CH @12 C~X  
@13 14

VAR G1=12/13

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I

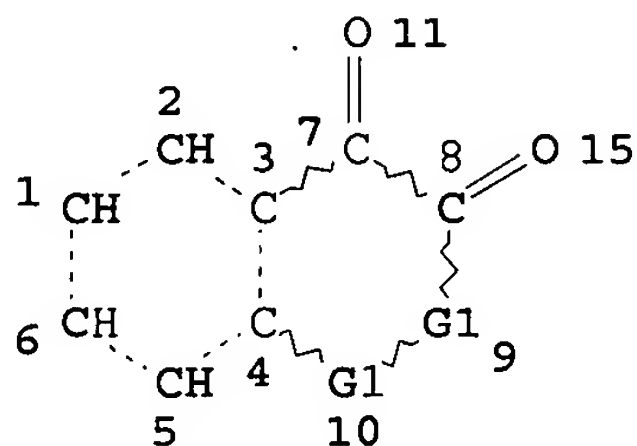
NUMBER OF NODES IS 14

STEREO ATTRIBUTES: NONE

L58 12332 SEA FILE=REGISTRY SSS FUL L55 NOT L54

L84 STR

CH @12 C~X  
@13 14



Formula (5)

VAR G1=12/13

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L86 58 SEA FILE=REGISTRY SUB=L58 SSS FUL L84

100.0% PROCESSED 2578 ITERATIONS

58 ANSWERS

SEARCH TIME: 00.00.01

=> d 175 que stat

L1 SCR 1918

L2 SCR 1841

L3 SCR 1968 OR 1958 OR 1938 OR 1985

L7 STR

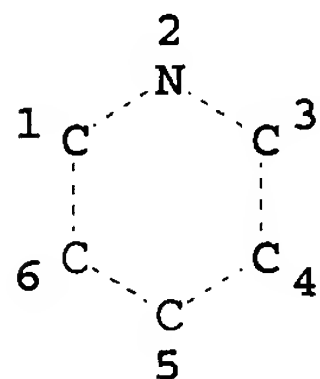
CN 1



NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 1

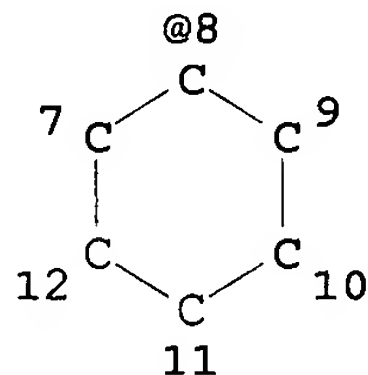
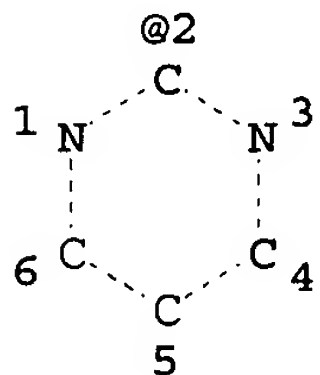
STEREO ATTRIBUTES: NONE  
L9 SCR 1312 OR 1707 OR 1526  
L11 STR



NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 6

STEREO ATTRIBUTES: NONE  
L13 SCR 2026  
L15 STR

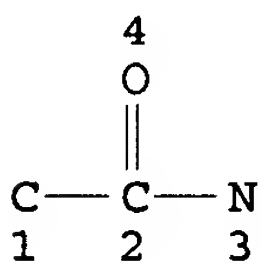


G1 13

VAR G1=2/8  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 13

STEREO ATTRIBUTES: NONE  
L17 STR

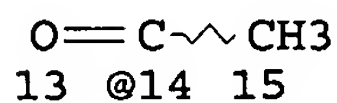
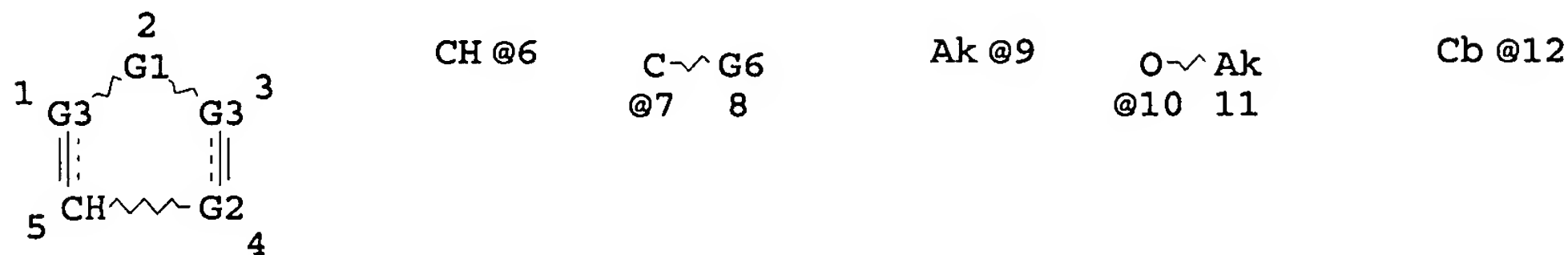


NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE  
L19 SCR 1267  
L21 STR

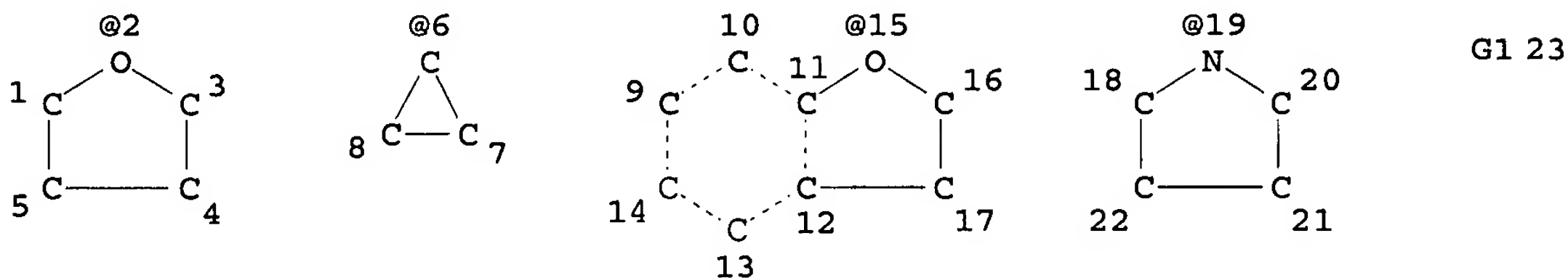


VAR G1=O/N/S  
VAR G2=C/N/O/S  
VAR G3=6/7  
VAR G6=9/10/12/14

NODE ATTRIBUTES:  
CONNECT IS E1 RC AT 9  
CONNECT IS E1 RC AT 11  
CONNECT IS E1 RC AT 12  
DEFAULT MLEVEL IS ATOM  
GGCAT IS SAT AT 11  
GGCAT IS UNS AT 12  
DEFAULT ECLEVEL IS LIMITED  
ECOUNT IS M1-X8 C AT 9  
ECOUNT IS M1-X6 C AT 11

GRAPH ATTRIBUTES:  
RSPEC I  
NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE  
L23 SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043  
L25 STR



VAR G1=2/6/15/19  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 23

STEREO ATTRIBUTES: NONE

L26 SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445

L28 SCR 1199 OR 2016 OR 1481

L30 STR

NO2 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L32 SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108

L34 STR

OH 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

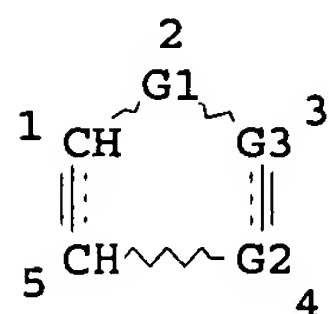
STEREO ATTRIBUTES: NONE

L36 SCR 2040

L38 SCR 1116 OR 1257

L41 9897 SEA FILE=REGISTRY SSS SAM (L21 NOT L7 NOT L11 NOT L15  
NOT L17 NOT L25 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR  
L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR L38 OR  
L36)

L73 STR



CH @6

C~G6  
@7 8

Ak @9

O~Ak  
@10 11

Cb @12

*Formula (6)*

O=C~CH3  
13 @14 15

VAR G1=O/N/S

VAR G2=N/O/S

VAR G3=6/7

VAR G6=9/10/12/14

NODE ATTRIBUTES:

CONNECT IS E1 RC AT 9

CONNECT IS E1 RC AT 11

CONNECT IS E1 RC AT 12

DEFAULT MLEVEL IS ATOM  
GGCAT IS SAT AT 11  
GGCAT IS UNS AT 12  
DEFAULT ECLEVEL IS LIMITED  
ECOUNT IS M1-X8 C AT 9  
ECOUNT IS M1-X6 C AT 11

GRAPH ATTRIBUTES:  
RSPEC I  
NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE  
L75 2262 SEA FILE=REGISTRY SUB=L41 SSS FUL L73

100.0% PROCESSED 9897 ITERATIONS 2262 ANSWERS  
SEARCH TIME: 00.00.01

=> fil hcap  
FILE 'HCAPLUS' ENTERED AT 17:25:14 ON 30 AUG 2006  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)

=> d l136 ibib abs hitstr hitind 1-6

L136 ANSWER 1 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2005:394066 HCAPLUS  
DOCUMENT NUMBER: 142:433099  
TITLE: **Electrolyte** for rechargeable lithium  
**battery**  
INVENTOR(S): Kim, Jin-Hee; Kim, Jin-Sung  
PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
SOURCE: Eur. Pat. Appl., 50 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1528616	A2	20050504	EP 2004-90417	20041101
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR, IS, YU				
KR 2005041859	A	20050504	KR 2004-65773	20040820
JP 2005142157	A2	20050602	JP 2004-318586	20041101
US 2005142448	A1	20050630	US 2004-980116	200411

CN 1770541 A 20060510 CN 2004-10104744 01  
200411  
01  
PRIORITY APPLN. INFO.: KR 2003-76913 A  
200310  
31  
KR 2004-65773 A  
200408  
20

OTHER SOURCE(S): MARPAT 142:433099

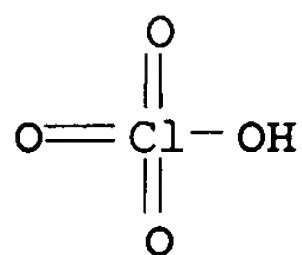
AB Disclosed is an **electrolyte** for a rechargeable lithium **battery** including: a first additive having an oxidn. potential of 4.1 to 4.6 V; a second additive having an oxidn. potential of 4.4 to 5.0 V; and a nonaq. org. solvent; and a **lithium salt**.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** for rechargeable lithium **battery**)

RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

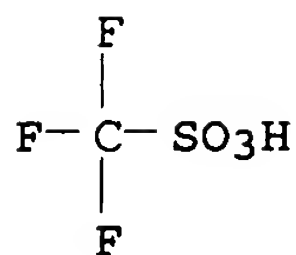
Li

RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

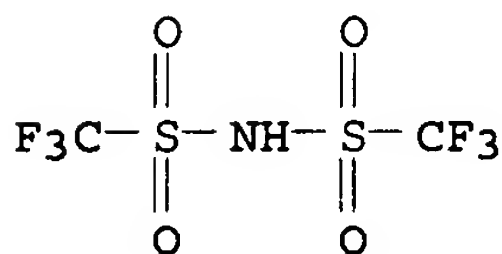
RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

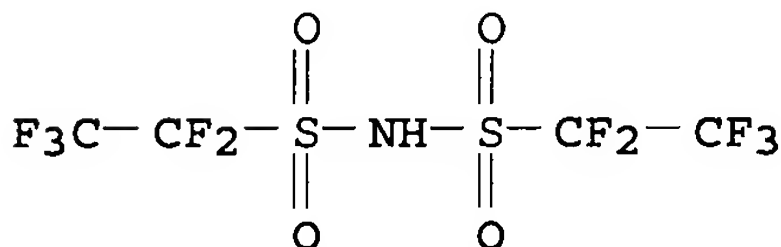
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

RN 132843-44-8 HCAPLUS

CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



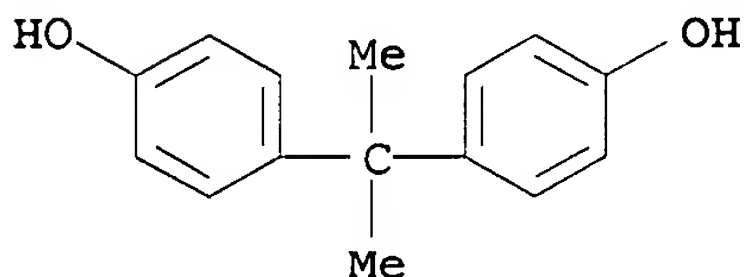
● Li

IT 80-05-7, Bisphenol A, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte for rechargeable lithium battery)

RN 80-05-7 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **electrolyte** rechargeable lithium **battery**

IT Alkenes, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(C2-8, copolymer with propylene; **electrolyte** for rechargeable lithium **battery**)

IT **Battery electrolytes**  
(**electrolyte** for rechargeable lithium **battery**)

IT Aromatic hydrocarbons, uses  
Esters, uses  
Ethers, uses  
Ketones, uses  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** for rechargeable lithium **battery**)

IT Fluoropolymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(**electrolyte** for rechargeable lithium **battery**)

IT Styrene-butadiene rubber, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(**electrolyte** for rechargeable lithium **battery**)

IT Secondary **batteries**  
(lithium; **electrolyte** for rechargeable lithium **battery**)

IT 71-43-2, Benzene, uses 96-49-1, Ethylene carbonate 98-95-3, Nitrobenzene, uses 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 108-88-3, Toluene, uses 108-90-7, Chlorobenzene, uses 462-06-6, Fluorobenzene 463-79-6D, Carbonic acid, ester 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 623-96-1, Dipropyl carbonate 1330-20-7, Xylene, uses 4437-85-8, Butylene carbonate 7439-93-2, Lithium, uses 7440-44-0, Carbon, uses 7447-41-8, Lithium chloride, uses 7791-03-9, Lithium perchlorate 10377-51-2, Lithium iodide 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 25496-08-6, Fluorotoluene 27359-10-0, Trifluorotoluene 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 35363-40-7, Ethyl propyl carbonate 37220-89-6, Aluminum lithium oxide 56525-42-9, Methyl propyl carbonate 90076-65-6 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** for rechargeable lithium **battery**)

IT 79-41-4D, Methacrylic acid, copolymer with methacrylic alkyl ester 80-05-7, Bisphenol A, uses 80-09-1, Bisphenol S 106-38-7, 4-Bromotoluene 106-43-4, 4-Chlorotoluene 115-07-1D, Propylene, copolymer with C2-8 olefin 352-32-9, 4-Fluorotoluene 530-48-3, 1,1-Diphenyl ethylene 772-00-9, 4-Phenyl-1,3-dioxane 843-55-0, 4,4'-Cyclohexylidene bisphenol 1075-20-3, 4-Phenyl-1,3-dioxolane 1478-61-1, 4,4'-(Hexafluoroisopropylidene)diphenol 9000-11-7 9003-39-8, Polyvinylpyrrolidone 9004-34-6D, Cellulose, compds. 9004-57-3, Ethyl cellulose 9004-62-0 9004-64-2, Hydroxypropyl cellulose 9004-65-3, Hydroxypropyl methyl cellulose 9004-67-5, Methyl cellulose 9062-14-0, Ethyl hydroxypropyl cellulose 10192-62-8,

Bisphenol A diacetate 24937-79-9, PVDF 25549-84-2, Polysodium acrylate

RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte for rechargeable lithium battery)

IT 9003-55-8

RL: MOA (Modifier or additive use); USES (Uses)  
(styrene-butadiene rubber; electrolyte for rechargeable lithium battery)

L136 ANSWER 2 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:932030 HCAPLUS

DOCUMENT NUMBER: 141:398152

TITLE: Electrolyte solution for secondary lithium battery and the battery

INVENTOR(S): Kim, Jin Hee; Kim, Jin Sung; Hwang, Sang Moon; Baek, Ho Sung; Kim, Hak Soo

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: Jpn. Kokai Tokkyo Koho, 19 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2004311442	A2	20041104	JP 2004-111392	20040405
KR 2004086920	A	20041013	KR 2003-21110	20030403
US 2004259002	A1	20041223	US 2004-817761	20040402
CN 1540794	A	20041027	CN 2004-10038747	20040405
PRIORITY APPLN. INFO.:			KR 2003-21110	A 20030403

AB The electrolyte soln. contains a Li salt, a nonaq. org. solvent, and an additive having a decompn. starting voltage 4-5 V and a const. current in a  $\geq 0.5$  V wide range on its linear sweep voltammogram. The additive is selected from bisphenol A, 2,5-dimethylfuran, 2,3-dichloro-1,4-naphthoquinone. The battery has suppressed gas formation when stored at high temps., and has improved safety when overcharged.

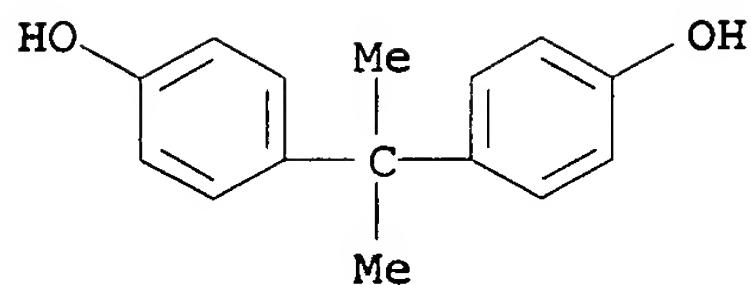
IT 80-05-7, Bisphenol A, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(additives in electrolyte solns. in secondary lithium batteries for safety and high temp. storing performance)

RN 80-05-7 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)





IC ICM H01M010-40  
ICS H01M004-02; H01M004-58  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST secondary lithium **battery** electrolyte additive safety  
IT **Battery** electrolytes  
Safety  
(electrolyte solns. contg. additives in secondary lithium  
**batteries** for safety and high temp. storing performance)  
IT Secondary **batteries**  
(lithium; electrolyte solns. contg. additives in secondary  
lithium **batteries** for safety and high temp. storing  
performance)  
IT 80-05-7, Bisphenol A, uses 117-80-6, 2,3-Dichloro-1,4-  
naphthoquinone 625-86-5, 2,5-Dimethylfuran  
RL: MOA (Modifier or additive use); USES (Uses)  
(additives in electrolyte solns. in secondary lithium  
**batteries** for safety and high temp. storing performance)  
IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate  
21324-40-3, Lithium hexafluorophosphate  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solns. contg. additives in secondary lithium  
**batteries** for safety and high temp. storing performance)

L136 ANSWER 3 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:796490 HCAPLUS  
DOCUMENT NUMBER: 141:263480  
TITLE: A nonaqueous electrolyte for a lithium secondary  
**battery**  
INVENTOR(S): Noh, Hyeong-Gon; Jung, Cheol-Soo; Song, Eui-Hwan  
PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
SOURCE: Eur. Pat. Appl., 25 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1463143	A2	20040929	EP 2003-90265	200308 21
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
KR 2004083670	A	20041006	KR 2003-18226	200303 24
JP 2005108440	A2	20050421	JP 2003-183257	200306 26

CN 1532986 A 20040929 CN 2003-155677 200309  
02  
US 2004197667 A1 20041007 US 2003-653192 200309  
03  
PRIORITY APPLN. INFO.: KR 2003-18226 A 200303  
24

OTHER SOURCE(S): MARPAT 141:263480

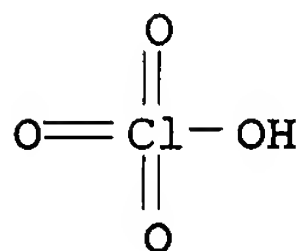
AB An electrolyte of a lithium secondary battery includes lithium salts, an org. solvent with a high b.p., and a carbonate-based additive compd. having substituents selected from the group consisting of a halogen, a CN, and a NO2. The electrolyte improves discharge, low temp., and cycle life characteristics of a lithium secondary battery.

IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 131651-65-5

RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte for lithium secondary battery)

RN 7791-03-9 HCAPLUS

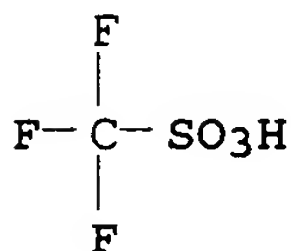
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCAPLUS

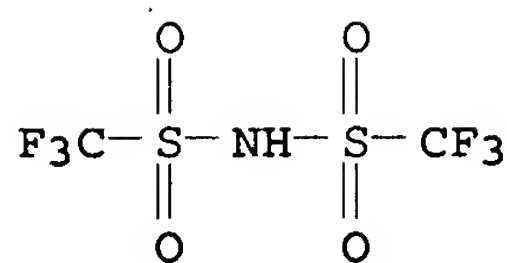
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



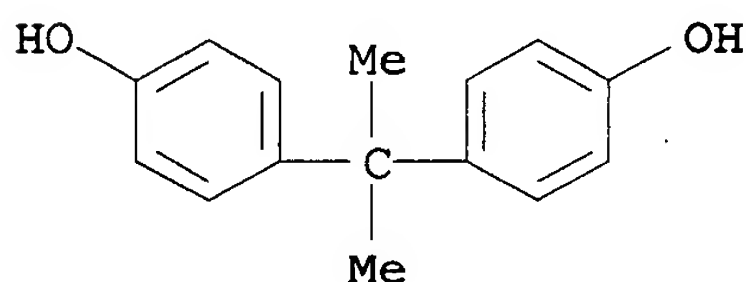
● Li

RN 131651-65-5 HCAPLUS  
 CN 1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, lithium salt  
 (9CI) (CA INDEX NAME)



● Li

IT 80-05-7, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary battery)  
 RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte lithium secondary battery  
 IT Secondary batteries  
 (lithium; nonaq. electrolyte for lithium secondary battery)  
 IT Battery electrolytes  
 (nonaq. electrolyte for lithium secondary battery)  
 IT Anhydrides  
 Aromatic hydrocarbons, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary battery)  
 IT Fluoropolymers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary battery)  
 IT Styrene-butadiene rubber, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary battery)  
 IT 67-68-5, DmsO, uses 68-12-2, Dmf, uses 71-43-2, Benzene, uses  
 75-05-8, Acetonitrile, uses 79-16-3, N-Methylacetamide 96-48-0,  
 γ-Butyrolactone 96-49-1, Ethylene carbonate 105-58-8,  
 Diethyl carbonate 108-32-7, Propylene carbonate 108-88-3,

Toluene, uses 123-39-7, n-Methylformamide 126-33-0, Sulfolane 462-06-6, Fluorobenzene 616-38-6, Dimethyl carbonate 616-42-2, Dimethyl sulfite 623-53-0, Methyl ethyl carbonate 623-96-1, Dipropyl carbonate 872-50-4, N-Methylpyrrolidone, uses 1330-20-7, Xylene, uses 4437-85-8, Butylene carbonate 7447-41-8, Lithium chloride, uses 7782-42-5, Graphite, uses 7791-03-9, Lithium perchlorate 10377-51-2, Lithium iodide 12003-67-7, 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 25496-08-6, Fluorotoluene 27359-10-0, TriFluorotoluene 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 35363-40-7, Ethyl propyl carbonate 56525-42-9, Methyl propyl carbonate 90076-65-6 131651-65-5 162684-16-4, Lithium manganese nickel oxide

RL: DEV (Device component use); USES (Uses)

(nonaq. electrolyte for lithium secondary battery)

IT 67-71-0, Methyl sulfone 77-77-0, Vinyl sulfone 80-05-7, uses 104-92-7, 4-Bromoanisole 127-63-9, Phenyl sulfone 452-10-8, 2,4-Difluoroanisole 456-49-5, 3-Fluoroanisole 459-60-9, 4-Fluoroanisole 463-79-6D, Carbonic acid, cyclic ester 620-32-6, Benzyl sulfone 623-12-1, 4-Chloroanisole 1073-05-8, 1,3-Propanediol cyclic sulfate 1120-71-4, Propane sultone 1888-91-1, n-Acetylcaprolactam 1889-59-4, Ethyl vinyl sulfone 2398-37-0, 3-Bromoanisole 2845-89-8, 3-Chloroanisole 3680-02-2, Methyl vinyl sulfone 5535-48-8, Phenyl vinyl sulfone 24937-79-9, PvdF 28452-93-9, Butadiene sulfone 28802-49-5, Dimethylfuran 93343-10-3, 3,5-Difluoroanisole 114435-02-8, Fluoroethylene carbonate 202925-08-4, 3-Chloro-5-fluoroanisole 756901-22-1 756901-23-2

RL: MOA (Modifier or additive use); USES (Uses)

(nonaq. electrolyte for lithium secondary battery)

IT 9003-55-8

RL: MOA (Modifier or additive use); USES (Uses)

(styrene-butadiene rubber; nonaq. electrolyte for lithium secondary battery)

L136 ANSWER 4 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:753254 HCAPLUS

DOCUMENT NUMBER: 141:228183

TITLE: A nonaqueous electrolyte for lithium secondary battery

INVENTOR(S): Kim, Jin-Hee; Kim, Jin-Sung; Hwang, Sang-Moon; Paik, Meen-Seon; Kim, Hak-Soo

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea; Cheil Industries Inc.

SOURCE: Eur. Pat. Appl., 33 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1458048	A1	20040915	EP 2003-90262	20030821

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,

PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU,  
SK

KR 2004080775	A	20040920	KR 2003-15749	200303 13
JP 2005108439	A2	20050421	JP 2003-183239	200306 26
CN 1531134	A	20040922	CN 2003-155332	200308 27
US 2004185347	A1	20040923	US 2003-658272	200309 10

PRIORITY APPLN. INFO.:

<--

KR 2003-15749	A	200303 13
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OTHER SOURCE(S): MARPAT 141:228183

AB An **electrolyte** for a lithium secondary **battery** includes **lithium salts**, a nonaq. org. solvent, and additive compds. The additive compds. added to the **electrolyte** of the present invention decomp. earlier than the org. solvent to form a conductive polymer layer on the surface of a pos. electrode, and prevent decompn. of the org. solvent. Accordingly, the **electrolyte** inhibits gas generation caused by decompn. of the org. solvent at initial charging, and thus reduces an increase of internal pressure and swelling during high temp. storage, and also improves safety of the **battery** during overcharge.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 131651-65-5, Lithium nonafluorobutanesulfonate

RL: DEV (Device component use); USES (Uses)  
(nonaq. **electrolyte** for lithium secondary **battery**)

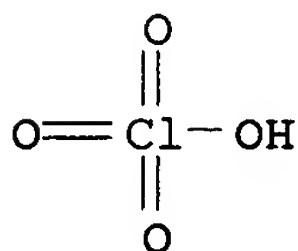
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

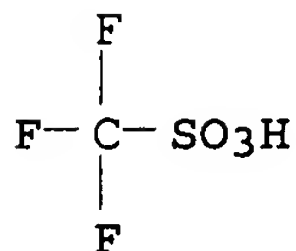
RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



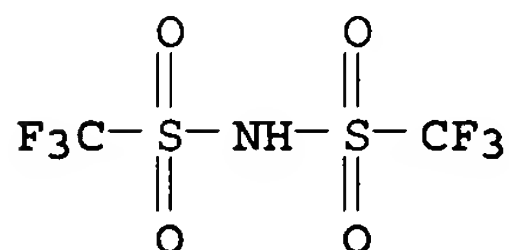
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

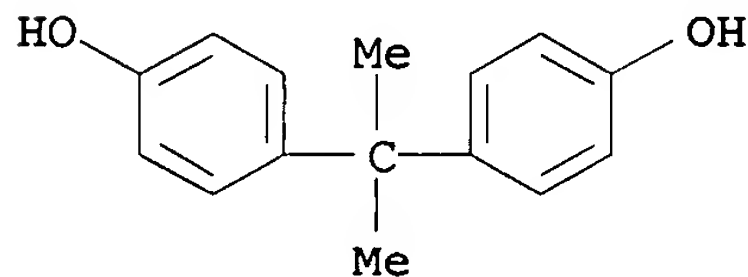
RN 131651-65-5 HCAPLUS  
 CN 1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, lithium salt (9CI) (CA INDEX NAME)



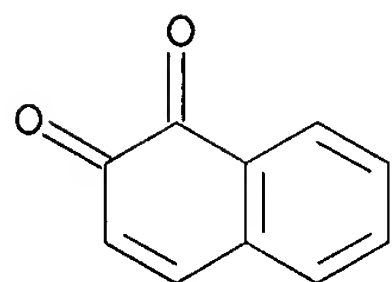
● Li

IT 80-05-7, Bisphenol A, uses 524-42-5,  
 1,2-Naphthoquinone 7474-83-1, 3-Bromo-1,2-naphthoquinone  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary  
 battery)

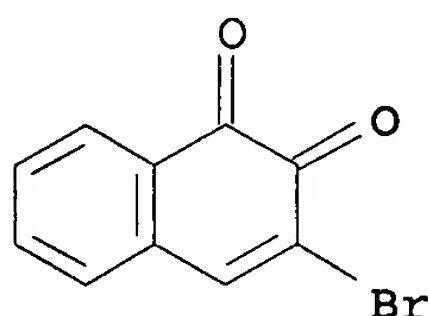
RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



RN 524-42-5 HCAPLUS  
 CN 1,2-Naphthalenedione (9CI) (CA INDEX NAME)



RN 7474-83-1 HCAPLUS  
 CN 1,2-Naphthalenedione, 3-bromo- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte lithium secondary battery;  
 safety nonaq electrolyte lithium secondary battery  
 IT Secondary batteries  
 (lithium; nonaq. electrolyte for lithium secondary  
 battery)  
 IT Battery electrolytes  
 Conducting polymers  
 Safety  
 Swelling, physical  
 (nonaq. electrolyte for lithium secondary  
 battery)  
 IT Aromatic hydrocarbons, uses  
 Esters, uses  
 Ethers, uses  
 Ketones, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary  
 battery)  
 IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary  
 battery)  
 IT 67-71-0, Methylsulfone 71-43-2, Benzene, uses 77-77-0,  
 Vinylsulfone 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
 carbonate 108-32-7, Propylene carbonate 108-88-3, Toluene, uses  
 126-33-0, Tetramethylene sulfone 127-63-9, Phenylsulfone  
 462-06-6, Fluorobenzene 463-79-6D, Carbonic acid, chain ester  
 463-79-6D, Carbonic acid, cyclic ester 463-79-6D, Carbonic acid,  
 ester 616-38-6, Dimethyl carbonate 620-32-6, Benzylsulfone  
 623-53-0, Methyl ethyl carbonate 623-96-1, Dipropyl carbonate  
 1330-20-7, Xylene, uses 1889-59-4, Ethylvinylsulfone 3680-02-2,  
 Methylvinylsulfone 4437-85-8, Butylene carbonate 5535-43-3,  
 m-ChloroPhenyl vinyl sulfone 5535-48-8, Phenylvinylsulfone  
 7439-93-2, Lithium, uses 7447-41-8, Lithium chloride

(LiCl), uses 7791-03-9, Lithium perchlorate 10377-51-2, Lithium iodide 14024-11-4, Aluminum lithium chloride AlLiCl<sub>4</sub> 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 27359-10-0, Trifluorotoluene 28122-14-7, p-Fluorophenyl vinyl sulfone 28452-93-9, Butadiene sulfone 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 35363-40-7, Ethyl propyl carbonate 37220-89-6, Aluminum lithium oxide 39300-70-4, Lithium nickel oxide 56525-42-9, Methyl propyl carbonate 90076-65-6 131651-65-5, Lithium nonafluorobutanesulfonate 162684-16-4, Lithium manganese nickel oxide

RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte for lithium secondary battery)

IT 80-05-7, Bisphenol A, uses 95-15-8, Thianaphthene 117-80-6, 2,3-Dichloro-1,4-naphthoquinone 271-89-6, 2,3-Benzofuran 524-42-5, 1,2-Naphthoquinone 625-86-5, 2,5-Dimethylfuran 693-98-1, 2-Methylimidazole 1192-62-7, 2-Acetylfuran 1193-79-9, 2-Acetyl-5-methylfuran 4265-27-4, 2-Butylbenzofuran 7474-83-1, 3-Bromo-1,2-naphthoquinone 13243-65-7, 2,3-Dibromo-1,4-naphthoquinone 16851-82-4, 1-(Phenylsulfonyl)pyrrole

RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte for lithium secondary battery)

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L136 ANSWER 5 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:847742 HCAPLUS  
DOCUMENT NUMBER: 136:9010  
TITLE: Solid polymer electrolyte  
INVENTOR(S): Ogawa, Noriyoshi; Kanekawa, Tatsuya  
PATENT ASSIGNEE(S): Mitsubishi Gas Chemical Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001325990	A2	20011122	JP 2000-141683	20000515
PRIORITY APPLN. INFO.:			JP 2000-141683	20000515

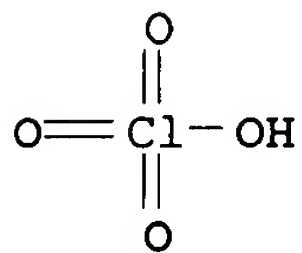
GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*



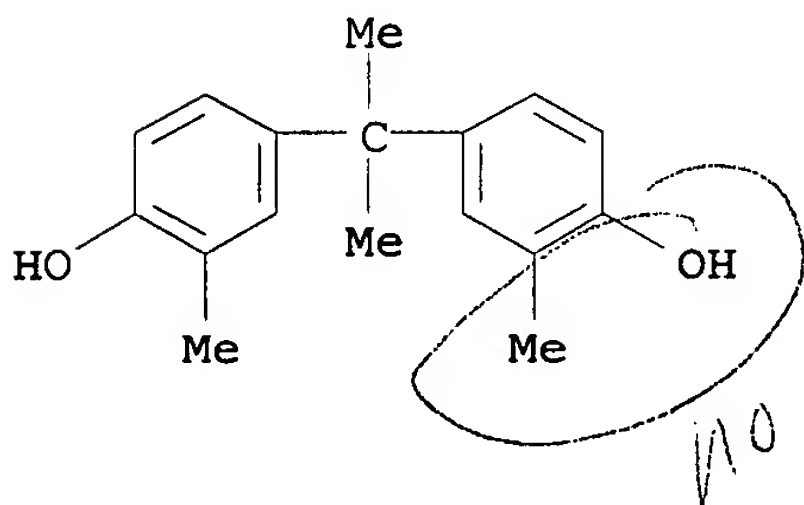
AB The electrolyte contains an ionizable Group I or Group II metal salt and a copolymer, having limiting viscosity 0.2-2.0 dL/g, and contg. repeating units I (R1-4 = H, C1-10 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, or C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents; X = -(CR5R6)<sub>n</sub>-, -S-, -SO<sub>2</sub>-, -O-, -CO-, -SO-, II, or III; R5-6 = H, C1-10 alkyl, C6-12 aryl, C2-5 alkenyl, or C1-5 alkoxy groups that may contain C1-5 alkyl, C2-5 alkenyl or C1-5 alkoxy substituents, or R5 and R6 joined to form a (heterocyclic) ring; R7-8 = H, C1-10 alkyl, C2-10 alkenyl, C1-10 alkoxy, or C6-12 aryl group; a = 0-20 integer) and 20-70 mol% IV (R9-10 = H, C1-5 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents; R11-14 = H, C1-5 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents; R15 = C1-6 alkylene group, alkylidene group, or single bond; Y = polymer or random copolymer of -SiR16R17O- and/or -SiR18R19O- having d.p. 0-200, R16-19 = H, C1-5 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents). The electrolyte is useful for **batteries**.

IT 7791-03-9, Lithium perchlorate  
 RL: DEV (Device component use); USES (Uses)  
 (compns. of solid polymer electrolyte contg. carbonate ester-siloxane copolymer for secondary lithium **batteries**)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

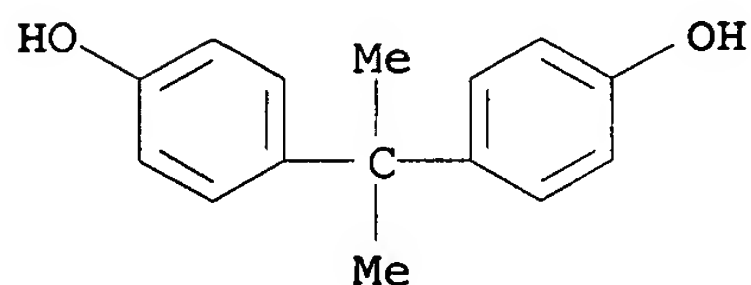


● Li

IT 79-97-0, 2,2-Bis(4-hydroxy-3-methylphenyl)propane  
 80-05-7, 2,2-Bis(4-hydroxyphenyl)propane, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (in manuf. of solid polymer electrolyte contg. carbonate ester-siloxane copolymer for secondary lithium **batteries**)  
 RN 79-97-0 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis[2-methyl- (9CI) (CA INDEX NAME)]



RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS C08G064-04; C08K003-00; C08L069-00; H01B001-06  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **battery** carbonate siloxane copolymer electrolyte compn  
 IT **Battery** electrolytes  
 (compns. of solid polymer electrolyte contg. carbonate  
 ester-siloxane copolymer for secondary lithium **batteries**  
 )  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 7791-03-9, Lithium perchlorate 158626-68-7 163111-96-4  
 375369-96-3 375369-98-5  
 RL: DEV (Device component use); USES (Uses)  
 (compns. of solid polymer electrolyte contg. carbonate  
 ester-siloxane copolymer for secondary lithium **batteries**  
 )  
 IT 75-44-5, Phosgen 79-97-0, 2,2-Bis(4-hydroxy-3-  
 methylphenyl)propane 80-05-7, 2,2-Bis(4-  
 hydroxyphenyl)propane, processes 843-55-0, 1,1-Bis(4-  
 hydroxyphenyl)cyclohexane 1571-75-1, 1,1-Bis(4-hydroxyphenyl)-1-  
 phenyl ethane 7775-14-6, Sodium hydrosulfite 27955-94-8,  
 1,1,1-Tris(4-hydroxyphenyl)ethane 88938-12-9, 9,9-Bis(4-hydroxy-3-  
 methylphenyl)fluorene 158167-48-7  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (in manuf. of solid polymer electrolyte contg. carbonate  
 ester-siloxane copolymer for secondary lithium **batteries**  
 )

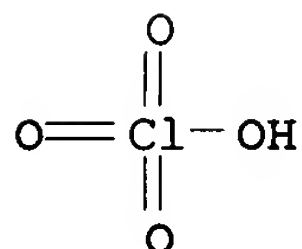
L136 ANSWER 6 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1992:110013 HCAPLUS  
 DOCUMENT NUMBER: 116:110013  
 TITLE: Ionic conductivity of epoxy network/polyethylene  
 glycol-lithium perchlorate complex IPN system  
 AUTHOR(S): Peng, Xinsheng; Song, Yongxian; Qi, Yuchen; Wu,  
 Shuyun; Li, Lixia; Chen, Donglin  
 CORPORATE SOURCE: Changchun Inst. Appl. Chem., Acad. Sin.,  
 Changchun, Peop. Rep. China  
 SOURCE: Chinese Journal of Polymer Science (1990), 8(4),  
 342-6  
 CODEN: CJPSEG; ISSN: 0256-7679  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB To prep. a polymeric solid electrolyte with both high ionic cond. at  
 ambient temp. and adequate mech. strength, an ionic conducting IPN  
 (interpenetrating networks) composed of bisphenol A epoxy  
 resin/polyethylene glycol contg. LiClO<sub>4</sub> was synthesized. The  
 dependence of cond. was investigated as a function of salt content,  
 compn., and temp. A max. of cond. appeared when EO/Li = 25, where  
 EO denotes the -CH<sub>2</sub>CH<sub>2</sub>O) - unit in polyethylene glycol. The temp.  
 dependence of cond. followed Vogel-Tammann-Fulcher equation, using

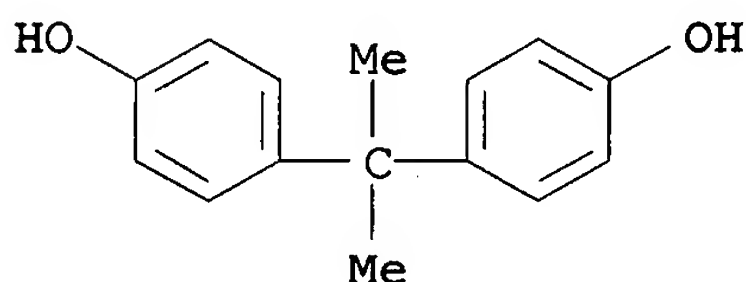
that the motion of ionic carriers resulted from the segmental motion of the polymer. When glycerol epoxy resin was used instead of bisphenol A epoxy, the ambient temp. (25) cond. could somewhat further be raised  $3 + 10^{-5}$  S/cm.

IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (interpenetrating network contg. epoxy resins and, ionic cond. of)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 80-05-7D, epoxy resin  
 RL: USES (Uses)  
 (interpenetrating network contg., ionic cond. of)  
 RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 37, 38, 76  
 ST ionic cond epoxy interpenetrating network; polyethylene glycol interpenetrating network epoxy; lithium perchlorate interpenetrating network epoxy; battery polymer electrolyte interpenetrating network epoxy  
 IT Battery electrolytes  
 (epoxy network/polyethylene glycol-lithium perchlorate system, ionic cond. of)  
 IT 7791-03-9, Lithium perchlorate 25322-68-3  
 RL: USES (Uses)  
 (interpenetrating network contg. epoxy resins and, ionic cond. of)  
 IT 56-81-5D, Glycerol, epoxy resin 80-05-7D, epoxy resin  
 RL: USES (Uses)  
 (interpenetrating network contg., ionic cond. of)

=> d 1117 ibib abs hitstr hitind 1-36

L117 ANSWER 1 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2006:657261 HCAPLUS  
 DOCUMENT NUMBER: 145:127575

TITLE: Long life lithium batteries with  
 stabilized electrodes  
 INVENTOR(S): Amine, Khalil; Liu, Jun; Visser, Donald R.; Lu,  
 Wenquan  
 PATENT ASSIGNEE(S): The University of Chicago, USA  
 SOURCE: U.S. Pat. Appl. Publ., 21 pp., Cont.-in-part of  
 U.S. Ser. No. 857,365.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2006147809	A1	20060706	US 2006-338902	20060124
US 2005019670	A1	20050127	US 2004-857365	20040528
<--				
PRIORITY APPLN. INFO.:			US 2004-857365	A2 20040528
			US 2005-647361P	P 20050126
			US 2003-488063P	P 20030717

AB The present invention relates to non-aq. **electrolytes** having electrode stabilizing additives, stabilized electrodes, and electrochem. devices contg. the same. Thus the present invention provides **electrolytes** contg. an alkali metal salt, a polar aprotic solvent, and an electrode stabilizing additive. In certain **electrolytes**, the alkali metal salt is a bis(chelato)borate and the additives include substituted or unsubstituted linear, branched or cyclic hydrocarbons comprising at least one oxygen atom and at least one aryl, alkenyl or alkynyl group. In other **electrolytes**, the additives include a substituted aryl compd. or a substituted or unsubstituted heteroaryl compd. wherein the additive comprises at least one oxygen atom. There are also provided methods of making the **electrolytes** and **batteries** employing the **electrolytes**. The invention also provides for electrode materials. Cathodes of the present invention may be further stabilized by surface coating the particles of the spinel or olivine with a material that can neutralize acid or otherwise lessen or prevent leaching of the manganese or iron ions. In some embodiments the coating is polymeric and in other embodiments the coating is a metal oxide such as ZrO<sub>2</sub>, TiO<sub>2</sub>, ZnO, WO<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, MgO, SiO<sub>2</sub>, SnO<sub>2</sub>, AlPO<sub>4</sub>, Al(OH)<sub>3</sub>, a mixt. of any two or more thereof.

IT 7439-93-2D, Lithium, alkyl fluorophosphate 7791-03-9, Lithium perchlorate 15365-14-7, Iron lithium phosphate felipo4 33454-82-9, Lithium triflate 90076-65-6

132843-44-8

RL: DEV (Device component use); USES (Uses)  
(long life lithium batteries with stabilized  
electrodes)

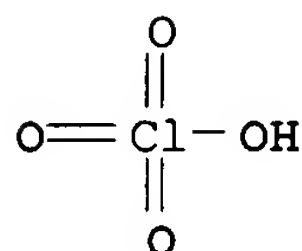
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

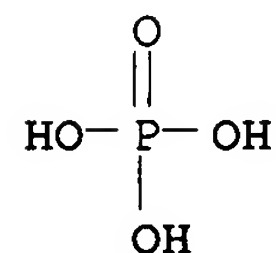
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 15365-14-7 HCAPLUS

CN Phosphoric acid, iron(2+) lithium salt (1:1:1) (9CI) (CA INDEX NAME)

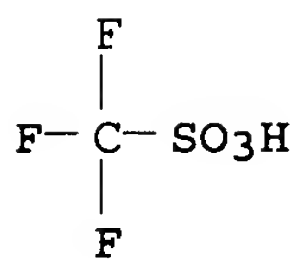


● Fe(II)

● Li

RN 33454-82-9 HCAPLUS

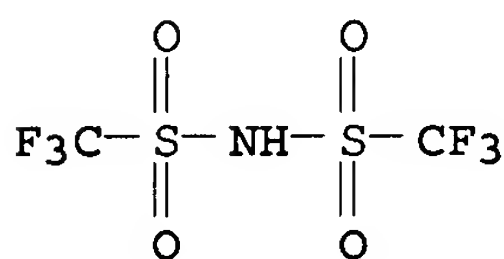
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

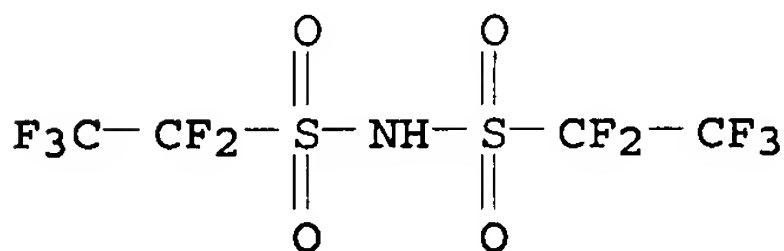
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

RN 132843-44-8 HCAPLUS

CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



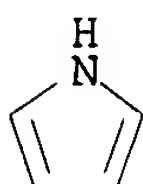
● Li

IT 109-97-7D, Pyrrole, aryloxy derivs. 110-00-9D, Furan, aryloxy derivs. 897381-31-6 897381-39-4 897381-44-1

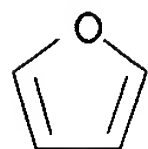
RL: MOA (Modifier or additive use); USES (Uses) (long life lithium batteries with stabilized electrodes)

RN 109-97-7 HCAPLUS

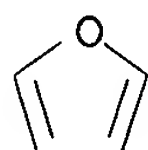
CN 1H-Pyrrole (9CI) (CA INDEX NAME)



RN 110-00-9 HCAPLUS  
CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)

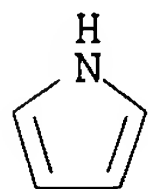


RN 897381-31-6 HCAPLUS  
CN Furan, diethenyl- (9CI) (CA INDEX NAME)



2 [ D1-CH=CH<sub>2</sub> ]

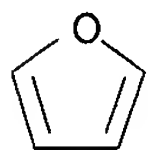
RN 897381-39-4 HCAPLUS  
CN 1H-Pyrrole, diethenylmethoxy- (9CI) (CA INDEX NAME)



D1-O-Me

2 [ D1-CH=CH<sub>2</sub> ]

RN 897381-44-1 HCAPLUS  
CN Furan, diethenylmethoxy- (9CI) (CA INDEX NAME)



D1-O-Me

2 [ D1-CH=CH<sub>2</sub> ]

INCL 429326000; 429330000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST lithium **battery** stabilized electrode  
IT Hydrocarbons, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(cyclic; long life lithium **batteries** with stabilized electrodes)  
IT Cyclic compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(hydrocarbons; long life lithium **batteries** with stabilized electrodes)  
IT Secondary **batteries**  
(lithium; long life lithium **batteries** with stabilized electrodes)  
IT **Battery** electrodes  
(long life lithium **batteries** with stabilized electrodes)  
IT Coating materials  
(surface; long life lithium **batteries** with stabilized electrodes)  
IT 60-29-7, Diethyl ether, uses 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-60-4, Propyl acetate 126-33-0, Sulfolane 141-78-6, Ethyl acetate, uses 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 7439-93-2D, Lithium, alkyl fluorophosphate 7791-03-9, Lithium perchlorate 12031-95-7, Lithium titanium oxide (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>) 14283-07-9, Lithium tetrafluoroborate 15365-14-7, Iron lithium phosphate felpo<sub>4</sub> 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 61179-01-9, Aluminum lithium manganese oxide 90076-65-6 132404-42-3 132843-44-8 244761-29-3, Lithium bisoxalatoborate 346417-97-8, Cobalt lithium manganese nickel oxide (Co<sub>0.33</sub>LiMn<sub>0.33</sub>Ni<sub>0.33</sub>O<sub>2</sub>) 409071-16-5 678966-16-0  
RL: DEV (Device component use); USES (Uses)  
(long life lithium **batteries** with stabilized electrodes)  
IT 84-15-1D, o-Terphenyl, aryloxy derivs. 86-74-8D, Carbazole, aryloxy derivs. 88-12-0, 1-Vinylpyrrolidin-2-one, uses 91-22-5D, Quinoline, aryloxy derivs. 101-84-8, Diphenyl ether 101-84-8D, Diphenyl ether, aryloxy derivs. 102-09-0, Diphenyl carbonate 102-09-0D, Phenyl carbonate, aryloxy derivs. 106-92-3, Allyl glycidyl ether 109-93-3, Divinyl ether 109-97-7D, Pyrrole, aryloxy derivs. 109-99-9D, Tetrahydrofuran, aryloxy derivs. 110-00-9D, Furan, aryloxy derivs. 110-89-4D, Piperidine, aryloxy derivs. 111-34-2, Butyl vinyl ether 120-92-3D, Cyclopentanone, aryloxy derivs. 140-67-0, 4-Allylanisole 142-96-1D, Butyl ether, aryloxy derivs. 176-53-4D, Ethylene silicate, aryloxy derivs. 288-32-4D, Imidazole, aryloxy derivs. 289-80-5D, Pyridazine, aryloxy derivs. 290-37-9D, Pyrazine, aryloxy derivs. 291-37-2D, Cyclotriphosphazene, Vinyl contg. derivs. 291-37-2D, Cyclotriphosphazene, aryloxy derivs. 503-30-0D, Oxetane, aryloxy derivs. 614-99-3D, Ethyl-2-furoate, aryloxy derivs. 930-22-3 1072-53-3D, Ethylene sulfate, aryloxy derivs. 1917-10-8, Vinyl-2-furoate 3724-65-0D, Crotonic acid, aryloxy derivs. 3741-38-6D, Ethylene sulfite, aryloxy derivs. 4245-37-8, Vinyl methacrylate 4370-23-4, 1-Vinylpiperidin-2-one 4427-96-7, Vinyl ethylene carbonate 5009-27-8D, Cyclopropanone, aryloxy derivs. 6622-92-0, 2,4-Dimethyl-6-hydroxy-pyrimidine 7570-02-7, DiVinyl



carbonate 12789-45-6, Methyl phosphate 14265-44-2D, Phosphate,  
aryloxy derivs. 14861-06-4, Vinyl crotonate 15896-04-5  
16053-89-7D, 2-Furancarboxylate, aryloxy derivs. 16410-02-9  
18358-13-9D, Methacrylate, aryloxy derivs. 21994-23-0  
23462-75-1, Dihydropyran-3-one 32893-16-6 33879-62-8,  
2-Vinyloxetane 36885-49-1, Vinyl phosphate 37203-76-2, Ethyl  
phosphate 37275-48-2D, Bipyridine, methoxy vinyl derivs.  
44414-27-9 50337-14-9, 3-Vinylcyclopentanone 53627-36-4,  
 $\beta$ -Vinyl- $\gamma$ -butyrolactone 57453-76-6 61548-40-1  
66166-61-8, 3-Vinylcyclobutanone 66281-16-1 66956-76-1  
72607-84-2 104531-81-9 117823-03-7 121712-01-4 139669-84-4  
557084-91-0 856785-12-1 866947-06-0 897028-07-8 897028-08-9  
897028-09-0 897028-10-3 897028-11-4 897028-12-5 897028-13-6  
897028-14-7 897028-15-8 897028-16-9 897028-17-0 897028-18-1  
897028-19-2 897028-20-5 897028-21-6 897028-22-7 897028-23-8  
897028-24-9 897028-25-0 897028-26-1 897028-27-2 897028-28-3  
897381-27-0 897381-28-1 897381-29-2 897381-30-5  
897381-31-6 897381-32-7 897381-33-8 897381-34-9  
897381-35-0 897381-36-1 897381-37-2 897381-38-3  
897381-39-4 897381-40-7 897381-41-8 897381-42-9  
897381-43-0 897381-44-1 897381-45-2 897381-46-3  
897381-47-4

RL: MOA (Modifier or additive use); USES (Uses)  
(long life lithium batteries with stabilized  
electrodes)

IT 1309-48-4, Magnesium oxide (MgO), uses 1314-13-2, Zinc oxide  
(ZnO), uses 1314-23-4, Zirconia, uses 1314-35-8, Tungsten  
trioxide, uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses  
7784-30-7, Aluminum phosphate alpo4 13463-67-7, Titania, uses  
18282-10-5, Tin dioxide 21645-51-2, Aluminum hydroxide, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(long life lithium batteries with stabilized  
electrodes)

L117 ANSWER 2 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:431288 HCAPLUS  
DOCUMENT NUMBER: 142:484779  
TITLE: Battery having electrolyte  
including one or more additives  
INVENTOR(S): Yoon, Sang Young; Nakahara, Hiroshi; Amine,  
Khalil  
PATENT ASSIGNEE(S): USA  
SOURCE: U.S. Pat. Appl. Publ., 31 pp., Cont.-in-part of  
U.S. Ser. No. 496,231,  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 11  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005106470	A1	20050519	US 2004-962125	200410 07
WO 2003083970	A1	20031009	WO 2003-US2127	200301 22

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CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,  
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,  
NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ,  
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW  
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SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,  
SN, TD, TG

WO 2003083971 A1 20031009 WO 2003-US2128

200301  
22

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RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,  
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EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,  
SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,  
SN, TD, TG

WO 2003083974 A1 20031009 WO 2003-US8783

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CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,  
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
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TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,  
BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,  
EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,  
SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG

US 2004248014 A1 20041209 US 2004-810081

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US 2005019656 A1 20050127 US 2004-496231

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US 2005170253 A1 20050804 US 2004-971912

200410  
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PRIORITY APPLN. INFO.:

WO 2003-US2127

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WO 2003-US2128

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US 2003-451065P	P	200302 26
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WO 2003-US8783	W	200303 20
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US 2004-542017P	P	200402 04
US 2004-543898P	P	200402 11
US 2004-543951P	P	200402 11
US 2004-810019	A2	200403 25
US 2004-810080	A2	200403 25
US 2004-810081	A2	200403 25
US 2004-563848P	P	200404 19
US 2004-563849P	P	200404 19
US 2004-563850P	P	200404 19
US 2004-563852P	P	200404 19
US 2004-565211P	P	200404 22
US 2004-496231	A2	200405 20
US 2004-601452P	P	200408

13

US 2002-104352	A	200203 22
<-- US 2002-167940	A	200206 12
<-- US 2003-443892P	P	200301 30
<-- US 2003-446848P	P	200302 11
<-- US 2003-502017P	P	200309 10
<-- US 2004-606340P	P	200409 01

AB A **battery** includes an **electrolyte** activating one or more anodes and one or more cathodes. The **electrolyte** includes one or more salts and one or more additives in a solvent. The solvent includes a silane or a siloxane. The one or more additives form a passivation layer on at least one of the anodes. In some instances, the additives include vinyl carbonate and/or vinyl ethylene carbonate.

IT 556-65-0, Lithium thiocyanate 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 115028-88-1 132843-44-8 345891-32-9

RL: DEV (Device component use); USES (Uses)  
(**battery** having **electrolyte** including one or more additives)

RN 556-65-0 HCAPLUS

CN Thiocyanic acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

HS-  $\text{C}\equiv\text{N}$

● Li

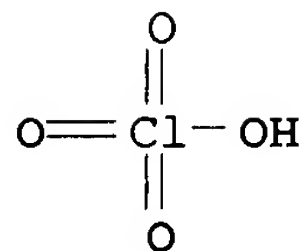
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

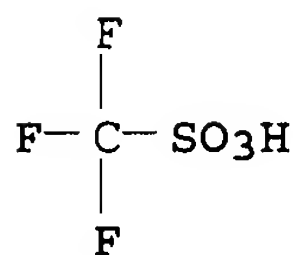
RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



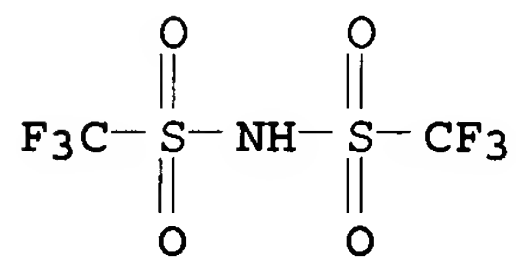
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



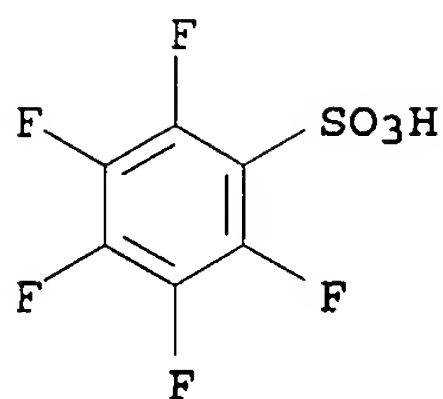
● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



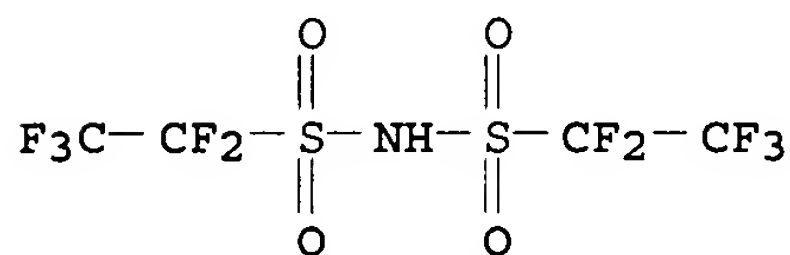
● Li

RN 115028-88-1 HCAPLUS  
 CN Benzenesulfonic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



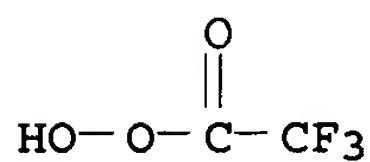
● Li

RN 132843-44-8 HCAPLUS  
 CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-  
 [(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



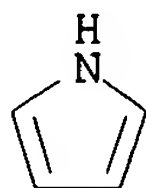
● Li

RN 345891-32-9 HCAPLUS  
 CN Ethaneperoxoic acid, trifluoro-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 29992-75-4  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (battery having electrolyte including one or  
 more additives)  
 RN 29992-75-4 HCAPLUS  
 CN 1H-Pyrrole, ethenyl- (9CI) (CA INDEX NAME)



D1- CH=CH<sub>2</sub>

IC ICM H01M010-40  
ICS H01M002-16  
INCL 429324000; 429137000; 429328000; 429330000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **battery electrolyte** additive  
IT Passivation  
(anode; **battery** having **electrolyte** including one or more additives)  
IT **Battery electrolytes**  
Primary **batteries**  
Secondary **batteries**  
(**battery** having **electrolyte** including one or more additives)  
IT Carbon fibers, uses  
Carbonaceous materials (technological products)  
RL: DEV (Device component use); USES (Uses)  
(**battery** having **electrolyte** including one or more additives)  
IT Polyoxyalkylenes, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(**battery** having **electrolyte** including one or more additives)  
IT Polysiloxanes, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(**battery** having **electrolyte** including one or more additives)  
IT 556-65-0, Lithium thiocyanate 917-54-4, Lithium methide  
7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 9002-88-4, Polyethylene 12135-01-2, Lithium imide 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 14485-20-2, Lithium tetraphenylborate 15955-98-3, Lithium tetrachlorogallate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 27208-14-6, Tetrasiloxane 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 90076-65-6  
115028-88-1 132404-42-3 132843-44-8  
193214-24-3, Aluminum cobalt lithium nickel oxide (Al<sub>0.05</sub>Co<sub>0.15</sub>LiNi<sub>0.80</sub>O<sub>2</sub>) 195144-63-9, Lithium oxide (Li<sub>2</sub>O)  
244761-29-3, Lithium bisoxalatoborate 345891-32-9  
RL: DEV (Device component use); USES (Uses)  
(**battery** having **electrolyte** including one or more additives)  
IT 463-79-6D, Carbonic acid, arom. ester 463-79-6D, Carbonic acid, cyclic ester 463-79-6D, Carbonic acid, vinyl ester 513-81-5  
1337-81-1, Vinyl pyridine 1469-73-4, Propylene sulfite 3741-38-6, Ethylene sulfite 4427-92-3, Phenyl ethylene carbonate 4427-96-7, Vinyl ethylene carbonate 7570-02-7 7803-62-5, Silane, uses 13940-57-3, Trisiloxane 16761-08-3 27306-78-1

29992-75-4 30676-86-9 71437-41-7 851904-00-2  
851904-03-5

RL: MOA (Modifier or additive use); USES (Uses)  
(battery having electrolyte including one or more additives)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); USES (Uses)  
(beads; battery having electrolyte including one or more additives)

IT 7782-42-5, Graphite, uses

RL: DEV (Device component use); USES (Uses)  
(flakes; battery having electrolyte including one or more additives)

IT 7664-38-2D, Phosphoric acid, fluorinated, alkyl ester

RL: DEV (Device component use); USES (Uses)  
(fluoro, lithium, alkyl; battery having electrolyte including one or more additives)

L117 ANSWER 3 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:283756 HCAPLUS

DOCUMENT NUMBER: 142:358036

TITLE: Nonaqueous lithium secondary battery  
with improved cyclability and/or high  
temperature safety

INVENTOR(S): Ryu, Duk-Hyun; Lee, Jae-Hyun; Jeong, Jun-Yong;  
Yeon, Jin-Hee; Jang, Min-Chul; Koo, Chang-Wan;  
Shin, Sun-Wik; Ku, Cha-Hun; Lee, Han-Ho

PATENT ASSIGNEE(S): Lg Chem, Ltd., S. Korea

SOURCE: PCT Int. Appl., 20 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2005029632	A1	20050331	WO 2004-KR2399	200409 20

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W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA,  
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP,  
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX,  
MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC,  
VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,  
AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,  
DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL,  
PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG

US 2005100786	A1	20050512	US 2004-944572	200409 17
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CA 2538605	AA	20050331	CA 2004-2538605	200409
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EP 1671393

A1

20060621

EP 2004-774658

200409

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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,  
PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK

PRIORITY APPLN. INFO.:

KR 2003-65169

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200309

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WO 2004-KR2399

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AB The present invention provides: (i) a nonaq. **electrolyte** for **batteries**, which is characterized by contg. halogen; (ii) a nonaq. **electrolyte** for **batteries**, which is characterized by contg. pyrrol or its deriv. and halogen; and (iii) a lithium secondary **battery** which is characterized by including the nonaq. **electrolyte** (i) or (ii). The inventive lithium secondary **battery** has improvements in charge/discharge and cycle life characteristics at ambient and high temps., and/or storage characteristics and safety at high temp.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)  
(nonaq. lithium secondary **battery** with improved cyclability and/or high temp. safety)

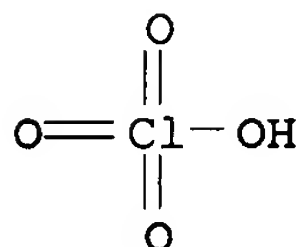
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

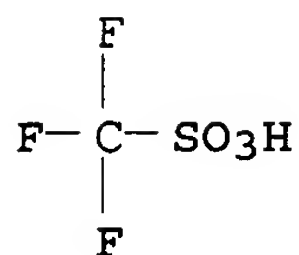
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

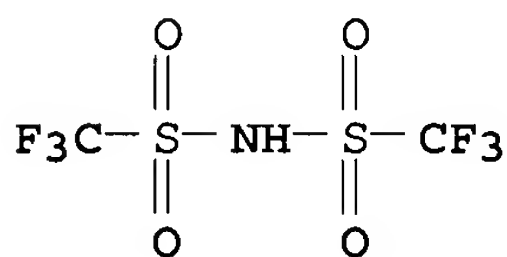
RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



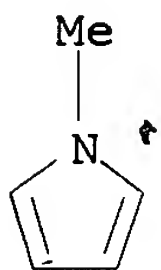
● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)

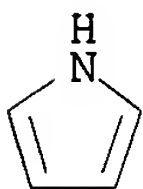


● Li

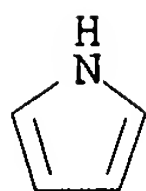
IT 96-54-8, n-Methylpyrrole 109-97-7, Pyrrole  
 109-97-7D, Pyrrole, deriv. 625-84-3,  
 2,5-Dimethylpyrrole 932-16-1, 2-Acetyl n-methylpyrrole  
 1072-83-9, 2-Acetylpyrrole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)  
 RN 96-54-8 HCAPLUS  
 CN 1H-Pyrrole, 1-methyl- (9CI) (CA INDEX NAME)



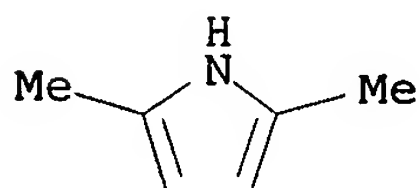
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 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



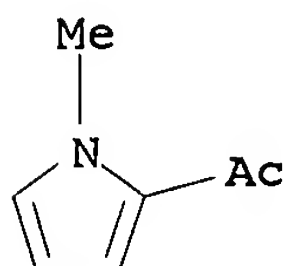
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 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



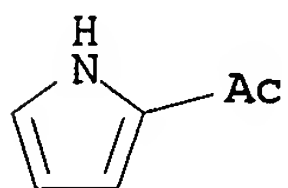
RN 625-84-3 HCAPLUS  
 CN 1H-Pyrrole, 2,5-dimethyl- (9CI) (CA INDEX NAME)



RN 932-16-1 HCAPLUS  
 CN Ethanone, 1-(1-methyl-1H-pyrrol-2-yl)- (9CI) (CA INDEX NAME)



RN 1072-83-9 HCAPLUS  
 CN Ethanone, 1-(1H-pyrrol-2-yl)- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq lithium secondary **battery** improved cyclability;  
 safety improvement nonaq lithium secondary **battery**  
 IT Transition metal oxides  
 RL: DEV (Device component use); USES (Uses)  
 (lithium-contg.; nonaq. lithium secondary **battery** with  
 improved cyclability and/or high temp. safety)  
 IT Secondary **batteries**  
 (lithium; nonaq. lithium secondary **battery** with  
 improved cyclability and/or high temp. safety)  
 IT **Battery electrolytes**  
 Safety  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)  
 IT Alloys, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)  
 IT Halogens  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate  
616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
7439-93-2, Lithium, uses 7440-44-0, Carbon, uses  
7791-03-9, Lithium perchlorate 12031-65-1, Lithium nickel  
oxide (LiNiO<sub>2</sub>) 12057-17-9, Lithium manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>)  
12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 14283-07-9, Lithium  
tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium  
triflate 56525-42-9, Methyl propyl carbonate 90076-65-6  
135573-53-4, Cobalt lithium nickel oxide co0-11ini0-1o2  
RL: DEV (Device component use); USES (Uses)  
(nonaq. lithium secondary **battery** with improved  
cyclability and/or high temp. safety)

IT 96-54-8, n-Methylpyrrole 109-97-7, Pyrrole  
109-97-7D, Pyrrole, deriv. 625-82-1, 2,4-Dimethylpyrrole  
625-84-3, 2,5-Dimethylpyrrole 932-16-1, 2-Acetyl  
n-methylpyrrole 1072-83-9, 2-Acetylpyrrole 7553-56-2,  
Iodine, uses 7726-95-6, Bromine, uses 7782-50-5, Chlorine, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. lithium secondary **battery** with improved  
cyclability and/or high temp. safety)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN  
THE RE FORMAT

L117 ANSWER 4 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2005:78059 HCAPLUS  
DOCUMENT NUMBER: 142:159580  
TITLE: Long life lithium **batteries** with  
stabilized electrodes  
INVENTOR(S): Amine, Khalil; Kim, Jaekook; Vissers, Donald R.  
PATENT ASSIGNEE(S): USA  
SOURCE: U.S. Pat. Appl. Publ., 13 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 2  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2005019670	A1	20050127	US 2004-857365	200405 28
			<--	
US 2006147809	A1	20060706	US 2006-338902	200601 24
PRIORITY APPLN. INFO.:			US 2003-488063P	P 200307 17
			<--	
			US 2004-857365	A2 200405 28
			US 2005-647361P	P 200501

26

AB The present invention relates to nonaq. **electrolytes** having stabilization additives and electrochem. devices contg. the same. Thus the present invention provides **electrolytes** contg. an alkali metal salt, a polar aprotic solvent, a first additive that is a substituted or unsubstituted organoamine, substituted or unsubstituted alkane, substituted or unsubstituted alkene, or substituted or unsubstituted aryl compd., and/or a second additive that is a metal(chelato)borate. When used in electrochem. devices with, e.g., lithium manganese oxide spinel electrodes, the new **electrolytes** provide **batteries** with improved calendar and cycle life.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 15365-14-7, Iron lithium phosphate  $\text{FeLiPO}_4$  33454-82-9, Lithium triflate 90076-65-6 132843-44-8

RL: DEV (Device component use); USES (Uses)  
(long life **lithium batteries** with stabilized electrodes)

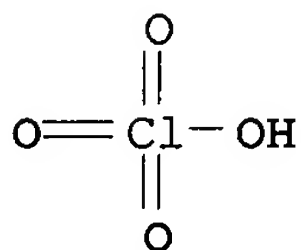
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

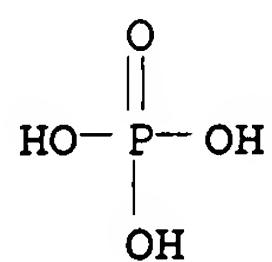
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 15365-14-7 HCAPLUS

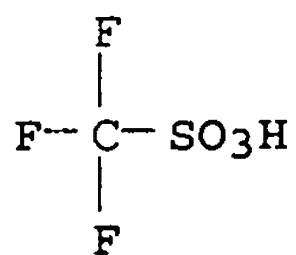
CN Phosphoric acid, iron(2+) lithium salt (1:1:1) (9CI) (CA INDEX NAME)



● Fe(II)

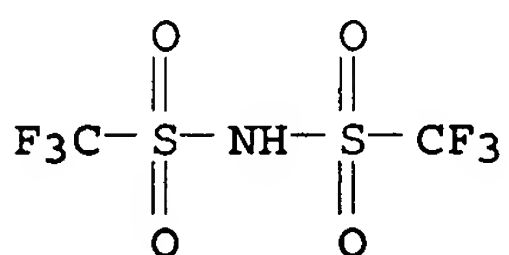
● Li

RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



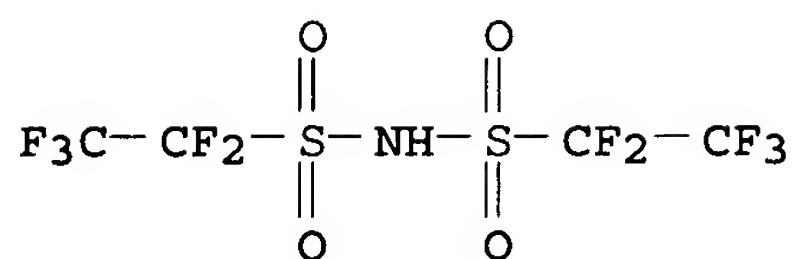
● Li

RN 90076-65-6 HCAPLUS  
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



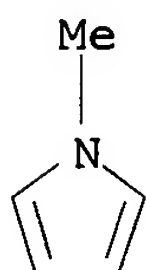
● Li

RN 132843-44-8 HCAPLUS  
CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 96-54-8, n-Methylpyrrole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium **batteries** with stabilized electrodes)  
 RN 96-54-8 HCAPLUS  
 CN 1H-Pyrrole, 1-methyl- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M004-58; H01M004-52; H01M004-60; H01M004-50  
 INCL 429326000; 429213000; 429224000; 429231100; 429223000; 429231300;  
 429221000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium **battery** stabilized electrode  
 IT Secondary **batteries**  
 (lithium; long life lithium **batteries** with stabilized electrodes)  
 IT Battery electrodes  
 Battery electrolytes  
 (long life lithium **batteries** with stabilized electrodes)  
 IT Intermetallic compounds  
 RL: DEV (Device component use); USES (Uses)  
 (long life lithium **batteries** with stabilized electrodes)  
 IT Alkanes, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium **batteries** with stabilized electrodes)  
 IT Alkenes, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium **batteries** with stabilized electrodes)  
 IT Aromatic compounds  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium **batteries** with stabilized electrodes)  
 IT Chelates  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium **batteries** with stabilized electrodes)

- IT Amines, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(org.; long life lithium **batteries** with stabilized electrodes)
- IT Tin alloy, base  
RL: DEV (Device component use); USES (Uses)  
(long life lithium **batteries** with stabilized electrodes)
- IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate  
115-10-6, Dimethyl ether 616-38-6, Dimethyl carbonate 623-53-0,  
Ethyl methyl carbonate 7439-93-2, Lithium, uses  
7440-44-0, Carbon, uses 7664-38-2D, Phosphoric acid, alkyl fluoro  
compd., **lithium salt** 7782-42-5, Graphite, uses  
7791-03-9, Lithium perchlorate 11099-11-9, Vanadium oxide  
12022-46-7, Iron lithium oxide ( $\text{FeLiO}_2$ ) 12031-65-1, Lithium nickel  
oxide ( $\text{LiNiO}_2$ ) 12031-95-7, Lithium titanium oxide ( $\text{Li}_4\text{Ti}_5\text{O}_{12}$ )  
12057-17-9, Lithium manganese oxide ( $\text{LiMn}_2\text{O}_4$ ) 12190-79-3, Cobalt  
lithium oxide ( $\text{CoLiO}_2$ ) 14283-07-9, Lithium tetrafluoroborate  
15365-14-7, Iron lithium phosphate  $\text{FeLiPO}_4$  21324-40-3,  
Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
33454-82-9, Lithium triflate 90076-65-6  
128975-24-6, Lithium manganese nickel oxide  $\text{Li}_{0.5}\text{Mn}_{0.5}\text{Ni}_{0.5}\text{O}_2$   
132404-42-3 132843-44-8 609349-41-9, Cobalt lithium  
manganese nickel oxide ( $\text{Co}_{0.3}\text{LiMn}_{0.3}\text{Ni}_{0.3}\text{O}_2$ )  
RL: DEV (Device component use); USES (Uses)  
(long life lithium **batteries** with stabilized electrodes)
- IT 84-15-1, o-Terphenyl 91-19-0, Quinoxaline 91-20-3, Naphthalene,  
uses 91-22-5, Quinoline, uses 92-52-4, Biphenyl, uses  
96-54-8, n-Methylpyrrole 100-43-6, 4-Vinylpyridine  
100-69-6, 2-Vinylpyridine 101-84-8, Diphenyl ether 102-71-6,  
Triethanolamine, uses 103-29-7, 1,2-Diphenylethane 106-99-0,  
Butadiene, uses 110-86-1, Pyridine, uses 110-89-4, Piperidine,  
uses 119-65-3, Isoquinoline 120-72-9, Indole, uses 288-32-4,  
Imidazole, uses 289-80-5, Pyridazine 289-95-2, Pyrimidine  
290-37-9, Pyrazine 1118-58-7, 1,3-Dimethyl 1,3-butadiene  
1337-81-1, Vinyl Pyridine 4177-16-6, Pyrazine, vinyl- 4427-96-7,  
Vinyl ethylene carbonate 7570-02-7, Divinyl carbonate  
29383-23-1, Vinyl Imidazole 30676-86-9, Piperidine, vinyl-  
30851-79-7 31094-36-7 51222-11-8 66281-01-4 66281-16-1  
77208-21-0 244761-29-3, Lithium bis(oxalato)borate 409071-16-5  
RL: MOA (Modifier or additive use); USES (Uses)  
(long life lithium **batteries** with stabilized electrodes)

L117 ANSWER 5 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2004:633118 HCAPLUS  
DOCUMENT NUMBER: 141:126408  
TITLE: Lithium based **electrochemical**  
cell systems with suppression of gas  
evolution  
INVENTOR(S): Hyung, Yoo-Eup; Vissers, Donald R.; Amine,  
Khalil  
PATENT ASSIGNEE(S): The University of Chicago, USA  
SOURCE: U.S. Pat. Appl. Publ., 7 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1



## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004151951	A1	20040805	US 2003-738400	20031217

## PRIORITY APPLN. INFO.:

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US 2002-434214P	P	20021217
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## OTHER SOURCE(S): MARPAT 141:126408

AB Primary and secondary Li-ion and lithium-metal based **electrochem. cell** systems are disclosed. Suppression of gas generation is achieved in the cell through the addn. of an additive or additives to the **electrolyte** system of the resp. cell, or to the cell whether it be a liq., a solid- or plasticized polymer **electrolyte** system. The gas suppression additives are preferably based on unsatd. hydrocarbons.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 12676-27-6D, derivs. 15365-14-7, Iron lithium phosphate felipo4 33454-82-9, Lithium triflate 90076-65-6 132843-44-8 304646-82-0D, Phosphorofluoridic acid, monolithium salt, alkyl deriv.

RL: DEV (Device component use); USES (Uses)  
(lithium based **electrochem. cell** systems with suppression of gas evolution)

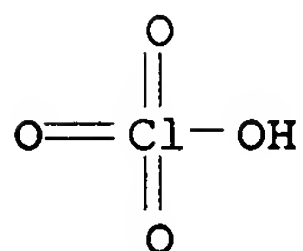
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

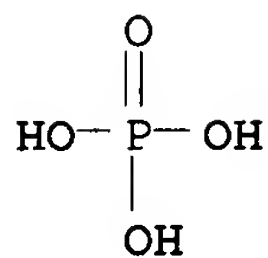
RN 12676-27-6 HCAPLUS

CN Boric acid, lithium salt (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 15365-14-7 HCAPLUS

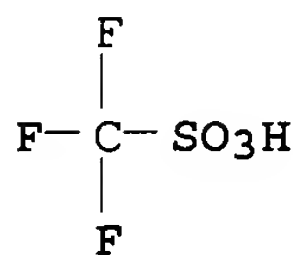
CN Phosphoric acid, iron(2+) lithium salt (1:1:1) (9CI) (CA INDEX NAME)



● Fe(II)

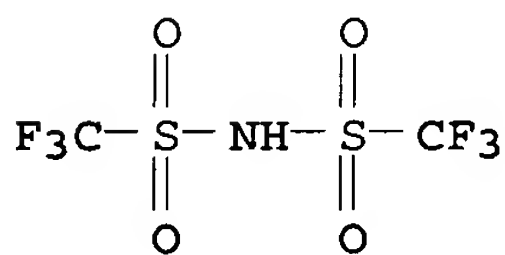
● Li

RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



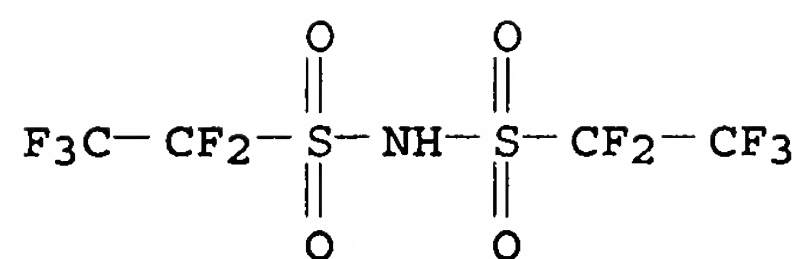
● Li

RN 90076-65-6 HCAPLUS  
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



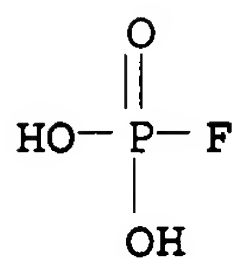
● Li

RN 132843-44-8 HCAPLUS  
CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



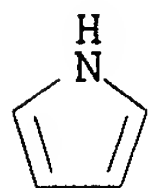
● Li

RN 304646-82-0 HCAPLUS  
 CN Phosphorofluoridic acid, monolithium salt (9CI) (CA INDEX NAME)

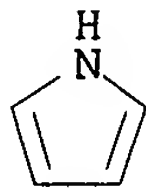


● Li

IT 109-97-7, Pyrrole 29992-75-4, 1H-Pyrrole, ethenyl-  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium based electrochem. cell systems with  
 suppression of gas evolution)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



RN 29992-75-4 HCAPLUS  
 CN 1H-Pyrrole, ethenyl- (9CI) (CA INDEX NAME)

D1-CH=CH<sub>2</sub>

IC ICM H01M016-00  
 ICS H01M004-50; H01M004-58; H01M004-52; H01M010-40; H01M010-34;  
 H01M010-52; H01M004-48  
 INCL 429009000; 429231400; 429231950; 429149000; 429326000; 429331000;  
 429332000; 429231100; 429231300; 429224000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST lithium **battery** gas generation suppression  
IT Primary **batteries**  
Secondary **batteries**  
(lithium; lithium based **electrochem. cell**  
systems with suppression of gas evolution)  
IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate  
623-53-0, Ethyl methyl carbonate 7439-93-2, Lithium, uses  
7440-44-0, Carbon, uses 7791-03-9, Lithium perchlorate  
11099-11-9, Vanadium oxide 12022-46-7, Iron lithium oxide  $\text{FeLiO}_2$   
12031-65-1, Lithium nickel oxide  $\text{LiNiO}_2$  12031-72-0, Lithium  
magnesium manganese oxide  $\text{LiMg}_{0.5}\text{Mn}_{1.5}\text{O}_4$  12057-17-9, Lithium  
manganese oxide  $\text{LiMn}_2\text{O}_4$  12190-79-3, Cobalt lithium oxide  $\text{CoLiO}_2$   
12676-27-6D, derivs. 14283-07-9, Lithium tetrafluoroborate  
15365-14-7, Iron lithium phosphate  $\text{FeLiPO}_4$  21324-40-3,  
Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
33454-82-9, Lithium triflate 90076-65-6  
128975-24-6, Lithium manganese nickel oxide  $\text{LiMn}_{0.5}\text{Ni}_{0.5}\text{O}_2$   
132404-42-3 132843-44-8 177997-11-4, Cobalt gallium  
lithium nickel oxide 177997-12-5, Boron Cobalt lithium nickel  
oxide 177997-13-6, Aluminum cobalt lithium nickel oxide  
244304-18-5, Cobalt lithium nickel silicon oxide 244304-20-9,  
Cobalt lithium nickel titanium oxide 304646-82-0D,  
Phosphorofluoridic acid, monolithium salt, alkyl deriv.  
609349-41-9, Cobalt Lithium manganese nickel oxide  
 $\text{Co}_{0.3}\text{LiMn}_{0.3}\text{Ni}_{0.3}\text{O}_2$   
RL: DEV (Device component use); USES (Uses)  
(lithium based **electrochem. cell**  
systems with suppression of gas evolution)  
IT 100-42-5, Styrene, uses 106-99-0, 1,3-Butadiene, uses  
109-97-7, Pyrrole 110-85-0, Piperazine, uses 115-86-6,  
Triphenylphosphate 463-79-6D, Carbonic acid, arom. ester  
513-81-5, 2,3-Dimethyl-1,3-butadiene 592-42-7, 1,5-Hexadiene  
758-86-1, 2,3-Dimethyl-1,4-pentadiene 1337-81-1, Vinylpyridine  
4427-96-7, Vinyl ethylene carbonate 16761-08-3 29992-75-4  
, 1H-Pyrrole, ethenyl- 71437-41-7, Piperazine, ethenyl-  
RL: MOA (Modifier or additive use); USES (Uses)  
(lithium based **electrochem. cell** systems with  
suppression of gas evolution)

L117 ANSWER 6 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:219899 HCAPLUS  
DOCUMENT NUMBER: 140:238519  
TITLE: Overcharge protection of nonaqueous rechargeable  
lithium **batteries** by cyano-substituted  
thiophenes as **electrolyte** additives  
INVENTOR(S): Otterstedt, Ralph; Kirchmeyer, Stephan; Brassat,  
Lutz  
PATENT ASSIGNEE(S): Germany  
SOURCE: U.S. Pat. Appl. Publ., 10 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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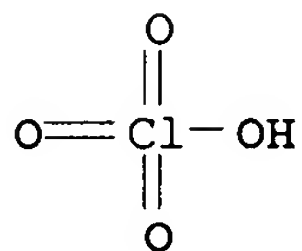
US 2004053138	A1	20040318	US 2003-660846	200309 12
DE 10340500	A1	20040325	DE 2003-10340500	200309 03
JP 2004111393	A2	20040408	JP 2003-323107	200309 16
CN 1490892	A	20040421	CN 2003-158890	200309 16
PRIORITY APPLN. INFO.:			DE 2002-10244589	200209 16

OTHER SOURCE(S): MARPAT 140:238519

AB The invention relates to the use of cyano-substituted thiophenes as **electrolyte** additives for protecting nonaq., rechargeable lithium **batteries** from overcharging, and lithium **batteries** comprising these additives. The **electrolyte** contains the thiophene additive at 2-5 vol.%.  
 IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate  
 RL: DEV (Device component use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium **batteries** by cyano-substituted thiophenes as **electrolyte** additives)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

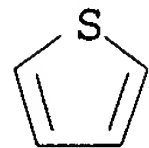
RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 110-02-1D, Thiophene, cyano-substituted  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium **batteries** by cyano-substituted thiophenes as **electrolyte** additives)  
 RN 110-02-1 HCAPLUS

CN Thiophene (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
ICS H01M004-52; H01M004-58; H01M004-40  
INCL 429307000; 429327000; 429231400; 429231800; 429231950; 429223000;  
429231100  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST lithium **battery** overcharge protection cyano substituted  
thiophene **electrolyte** additive  
IT Sulfonic acids, uses  
RL: DEV (Device component use); USES (Uses)  
(alkanesulfonic, perfluorinated. **lithium salts**  
; overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)  
IT Sulfonic acids, uses  
RL: DEV (Device component use); USES (Uses)  
(arenesulfonic, perfluorinated. **lithium salts**  
; overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)  
IT Imides  
RL: DEV (Device component use); USES (Uses)  
(bisfluoroalkylsulfonyl, **lithium salt**;  
overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)  
IT Perfluoro compounds  
RL: DEV (Device component use); USES (Uses)  
(carboxylic acids, **lithium salts**; overcharge  
protection of nonaq. rechargeable lithium **batteries** by  
cyano-substituted thiophenes as **electrolyte** additives)  
IT Carboxylic acids, uses  
RL: DEV (Device component use); USES (Uses)  
(esters; overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)  
IT Secondary **batteries**  
(lithium; overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)  
IT Polymers, uses  
RL: DEV (Device component use); USES (Uses)  
(membrane; overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)  
IT Carboxylic acids, uses  
RL: DEV (Device component use); USES (Uses)  
(nitriles; overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)  
IT **Battery electrolytes**  
Secondary **battery** separators  
(overcharge protection of nonaq. rechargeable lithium

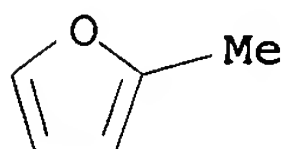
- batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)
- IT Alkanes, uses  
Carbonaceous materials (technological products)  
Ethers, uses  
Lactones  
Oxides (inorganic), uses  
Transition metal chalcogenides  
Transition metal oxides  
RL: DEV (Device component use); USES (Uses)  
(overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)
- IT Alkanes, uses  
RL: DEV (Device component use); USES (Uses)  
(perfluorinated; overcharge protection of nonaq. rechargeable  
lithium **batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)
- IT Carboxylic acids, uses  
RL: DEV (Device component use); USES (Uses)  
(perfluoro, lithium salts; overcharge  
protection of nonaq. rechargeable lithium **batteries** by  
cyano-substituted thiophenes as **electrolyte** additives)
- IT Glass, uses  
RL: DEV (Device component use); USES (Uses)  
(porous; overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)
- IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
108-32-7, Propylene carbonate 463-79-6D, Carbonic acid, ester  
616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
872-36-6, Vinylene carbonate 7439-93-2, Lithium, uses  
7791-03-9, Lithium perchlorate 12057-24-8, Lithium oxide,  
uses 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium  
hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
113066-89-0, Cobalt lithium nickel oxide  $\text{Co}_{0.2}\text{LiNi}_{0.8}\text{O}_2$   
131344-56-4, Cobalt lithium nickel oxide 177997-13-6, Aluminum  
Cobalt lithium nickel oxide 182442-95-1, Cobalt lithium manganese  
nickel oxide 244761-29-3, Lithium bisoxalatoborate  
RL: DEV (Device component use); USES (Uses)  
(overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)
- IT 110-02-1D, Thiophene, cyano-substituted  
RL: MOA (Modifier or additive use); USES (Uses)  
(overcharge protection of nonaq. rechargeable lithium  
**batteries** by cyano-substituted thiophenes as  
**electrolyte** additives)

L117 ANSWER 7 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2002:163800 HCAPLUS  
DOCUMENT NUMBER: 136:219519  
TITLE: Phenyl boron-based compounds as anion receptors  
for nonaqueous **battery**  
**electrolytes**

INVENTOR(S): Lee, Hung Sui; Yang, Xiao-qing; McBreen, James;  
Sun, Xuehui  
PATENT ASSIGNEE(S): Brookhaven Science Associates, Llc, USA  
SOURCE: U.S., 15 pp., Cont.-in-part of U. S. 6,022,643.  
CODEN: USXXAM  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 2  
PATENT INFORMATION:

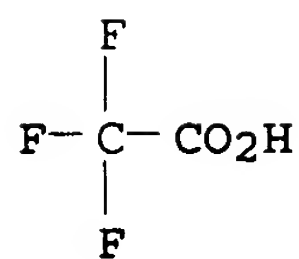
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6352798	B1	20020305	US 2000-492569	20000127
US 6022643	A	20000208	US 1997-986846	19971208
			US 1997-986846	19971208
			US 1997-986846	19971208

OTHER SOURCE(S): MARPAT 136:219519  
AB Novel fluorinated boronate-based compds. which act as anion receptors in nonaq. **battery electrolytes** are provided. When added to nonaq. **battery electrolytes**, the fluorinated boronate-based compds. of the invention enhance ionic cond. and cation transference no. of nonaq. **electrolytes**. The fluorinated boronate-based anion receptors include different fluorinated alkyl and aryl groups.  
IT 534-22-5, 2-Methylfuran 2923-17-3, Lithium trifluoroacetate 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 87187-79-9, Propanoic acid, pentafluoro-, **lithium salt** 87442-01-1, Benzoic acid, pentafluoro-, **lithium salt**  
RL: DEV (Device component use); USES (Uses)  
(Ph boron-based compds. as anion receptors for nonaq. **battery electrolytes**)  
RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 2923-17-3 HCAPLUS  
CN Acetic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



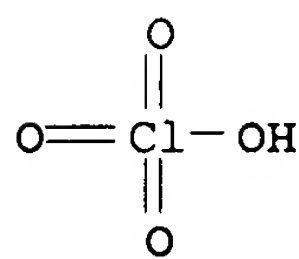


● Li

RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

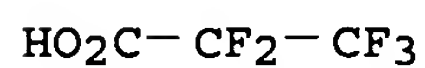
Li

RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



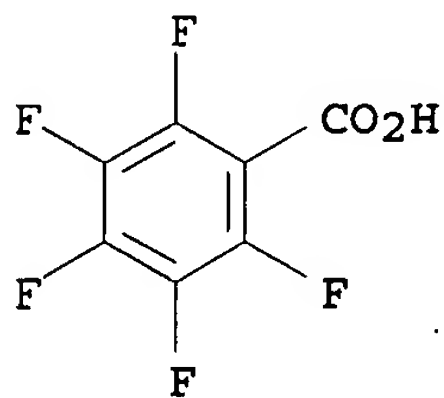
● Li

RN 87187-79-9 HCAPLUS  
CN Propanoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



● Li

RN 87442-01-1 HCAPLUS  
CN Benzoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



● Li

IC ICM H01M006-14  
 INCL 429324000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 27  
 ST **battery electrolyte** anion receptor fluorinated  
 boronate based compd  
 IT **Battery electrolytes**  
 Ionic conductivity  
 (Ph boron-based compds. as anion receptors for nonaq.  
**battery electrolytes**)  
 IT Polyanilines  
 Polyoxyalkylenes, uses  
 Polysulfides  
 Transition metal chalcogenides  
 Transition metal oxides  
 RL: DEV (Device component use); USES (Uses)  
 (Ph boron-based compds. as anion receptors for nonaq.  
**battery electrolytes**)  
 IT Oxides (inorganic), uses  
 RL: DEV (Device component use); USES (Uses)  
 (lithiated; Ph boron-based compds. as anion receptors for nonaq.  
**battery electrolytes**)  
 IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (Ph boron-based compds. as anion receptors for nonaq.  
**battery electrolytes**)  
 IT 75-05-8, Acetonitrile, uses 96-48-0,  $\gamma$ -Butyrolactone  
 96-49-1, Ethylene carbonate 107-31-3, Methyl formate 108-32-7,  
 Propylene carbonate 109-87-5, Dimethoxymethane 109-99-9, Thf,  
 uses 110-71-4, 1,2-Dimethoxyethane 115-10-6, Dimethyl ether  
 126-33-0, Sulfolane 534-22-5, 2-Methylfuran 616-38-6,  
 Dimethyl carbonate 646-06-0, 1,3-Dioxolane 872-50-4,  
 1-Methyl-2-pyrrolidinone, uses 1072-47-5 1072-71-5,  
 2,5-Dimercapto-1,3,4-thiadiazole 2923-17-3, Lithium  
 trifluoroacetate 7439-93-2, Lithium, uses 7440-44-0D,  
 Carbon, intercalation compd., with lithium 7447-41-8, Lithium  
 chloride, uses 7550-35-8, Lithium bromide 7789-24-4, Lithium  
 fluoride, uses 7791-03-9, Lithium perchlorate 9011-17-0,  
 Hexafluoropropylene-vinylidene fluoride copolymer 10377-51-2,  
 Lithium iodide 12031-65-1, Lithium nickel oxide linio2  
 12057-17-9, Lithium manganese oxide limn2o4 12162-79-7, Lithium  
 manganese oxide limno2 12190-79-3, Cobalt lithium oxide colio2  
 12201-18-2, Lithium molybdenum sulfide limos2 14283-07-9, Lithium  
 tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate  
 19836-78-3, 3-Methyl-2-oxazolidinone 21324-40-3, Lithium

hexafluorophosphate 25014-41-9, Polyacrylonitrile 25233-30-1,  
 Polyaniline 25322-68-3, Peo 25948-29-2, Carbon disulfide,  
 homopolymer 29935-35-1, Lithium hexafluoroarsenate 39448-96-9,  
 Graphite lithium 55326-82-4, Lithium titanium sulfide litis2  
 55886-04-9, Lithium niobium selenide Li3NbSe3 87187-79-9,  
 Propanoic acid, pentafluoro-, lithium salt  
 87442-01-1, Benzoic acid, pentafluoro-, lithium  
 salt 131344-56-4, Cobalt lithium nickel oxide  
 138187-48-1, Lithium vanadium oxide Li1.2V2O5 152991-98-5,  
 Aluminum lithium nickel oxide 159967-11-0, Lithium magnesium  
 nickel oxide 180984-62-7, Lithium nickel titanium oxide  
 256345-13-8, Lithium vanadium oxide Li2.5V6O13  
 RL: DEV (Device component use); USES (Uses)

(Ph boron-based compds. as anion receptors for nonaq.  
 battery electrolytes)

IT 23542-71-4P 365458-32-8P 365458-33-9P 365458-34-0P  
 365458-35-1P 365458-36-2P 365458-37-3P 365458-38-4P  
 365458-39-5P 365458-40-8P 402564-35-6P 402564-36-7P  
 402564-37-8P 402564-38-9P 402564-39-0P

RL: DEV (Device component use); MOA (Modifier or additive use); SPN  
 (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (Ph boron-based compds. as anion receptors for nonaq.

battery electrolytes)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN  
 THE RE FORMAT

L117 ANSWER 8 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:103441 HCAPLUS

DOCUMENT NUMBER: 136:153869

TITLE: Lithium-sulfur batteries with high  
 capacity and good rate capability

INVENTOR(S): Jung, Yongju; Kim, Seok; Choi, Yunsuk; Choi, Soo  
 Seok; Lee, Jeawoan; Hwang, Duck Chul; Kim, Joo  
 Soak

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: Eur. Pat. Appl., 10 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

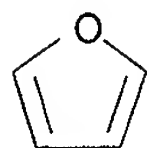
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1178555	A2	20020206	EP 2001-117788	20010802
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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
KR 2002011562	A	20020209	KR 2000-44900	20000802
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KR 2002011563	A	20020209	KR 2000-44901	20000802
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JP 2002075446 A2 20020315 JP 2001-213286 20010713  
US 2002045102 A1 20020418 US 2001-918463 20010801  
CN 1336696 A 20020220 CN 2001-132527 20010802  
KR 2000-44900 A 20000802  
KR 2000-44901 A 20000802

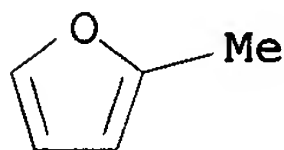
PRIORITY APPLN. INFO.:  
AB A lithium-sulfur **battery** includes a neg. electrode, a pos. electrode, and an **electrolyte**. The neg. electrode includes a neg. active material selected from materials in which lithium intercalation reversibly occur, lithium alloy or lithium metal. The pos. electrode includes at least one of elemental sulfur and organosulfur compds. for a pos. active material, and an elec. conductive material. The **electrolyte** includes at least two groups selected from a weak polar solvent group, a strong polar solvent group and a lithium protection solvent group, where the **electrolyte** includes at least one or more solvents selected from the same group. The **electrolyte** may optionally include one or more **electrolyte** salts.

IT 110-00-9, Furan 534-22-5, 2-Methylfuran 625-86-5, 2,5-Dimethylfuran 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(lithium-sulfur **batteries** with high capacity and good rate capability)

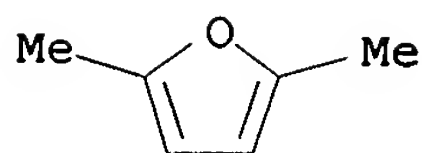
RN 110-00-9 HCAPLUS  
CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



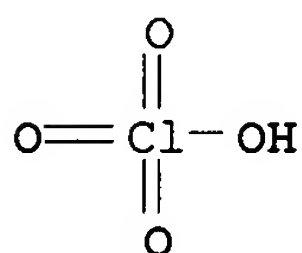
RN 625-86-5 HCAPLUS  
CN Furan, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

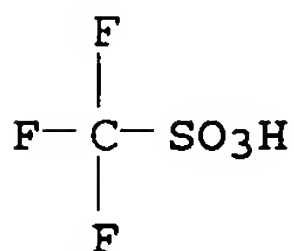
Li

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



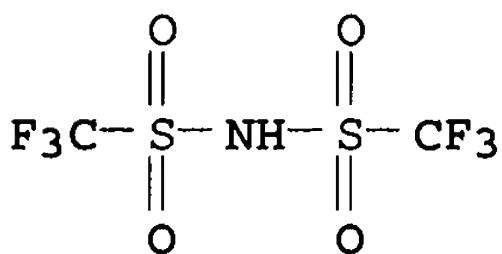
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IC ICM H01M010-40  
ICS H01M010-36

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium sulfur **battery** good rate capability

IT **Battery electrolytes**  
(lithium-sulfur **batteries** with high capacity and good rate capability)

IT Group IIIA elements  
Group IVA elements  
Sulfides, uses  
Transition metals, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(lithium-sulfur **batteries** with high capacity and good rate capability)

IT Quaternary ammonium compounds, uses  
RL: DEV (Device component use); USES (Uses)  
(tetraalkyl; lithium-sulfur **batteries** with high capacity and good rate capability)

IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(lithium-sulfur **batteries** with high capacity and good rate capability)

IT 60-29-7, Diethyl ether, uses 67-68-5, DmsO, uses 68-12-2, Dmf, uses 75-05-8, Acetonitrile, uses 75-21-8, Ethylene oxide, uses 77-78-1, Dimethyl sulfate 96-47-9, 2-Methyltetrahydrofuran 96-48-0,  $\gamma$ -Butyrolactone 105-58-8, Diethyl carbonate 108-88-3, Toluene, uses 109-99-9, Thf, uses 110-00-9, Furan 110-71-4 111-55-7, Ethylene glycol diacetate 115-10-6, Dimethyl ether 123-91-1, 1,4-Dioxan, uses 126-33-0, Sulfolane 127-19-5, Dimethyl acetamide 300-87-8, 3,5-Dimethylisoxazole 534-22-5, 2-Methylfuran 616-38-6, Dimethyl carbonate 616-42-2, Dimethyl sulfite 625-86-5, 2,5-Dimethylfuran 646-06-0, Dioxolane 680-31-9, Hexamethyl phosphoric triamide, uses 872-50-4, n-Methylpyrrolidone, uses 1072-47-5, 1,3-Dioxolane, 4-methyl 1330-20-7, Xylene, uses 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, org. compd. 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 19836-78-3 21324-40-3, Lithium hexafluorophosphate 33454-82-9, Lithium triflate 90076-65-6 147545-69-5, Ethylene glycol sulfite  
RL: DEV (Device component use); USES (Uses)  
(lithium-sulfur **batteries** with high capacity and good rate capability)

IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-96-5, Manganese, uses 7439-97-6, Mercury, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-20-2, Scandium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-25-7, Tantalum, uses 7440-26-8, Technetium, uses 7440-28-0, Thallium, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-43-9, Cadmium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses 7440-65-5, Yttrium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-74-6, Indium, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(lithium-sulfur **batteries** with high capacity and good rate capability)

rate capability)  
IT 74432-42-1, Lithium polysulfide  
RL: TEM (Technical or engineered material use); USES (Uses)  
(lithium-sulfur batteries with high capacity and good  
rate capability)

L117 ANSWER 9 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2001:449916 HCAPLUS  
DOCUMENT NUMBER: 135:45792  
TITLE: Methods of purifying organic lithium  
salts  
INVENTOR(S): Gorkovenko, Alexander; Soloveichik, Grigorii L.  
PATENT ASSIGNEE(S): Moltech Corporation, USA  
SOURCE: U.S., 16 pp., Cont.-in-part of U.S. Ser. No.  
127,468, abandoned.  
CODEN: USXXAM  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 2  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 6248883	B1	20010619	US 1998-205873	199812 04

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WO 2000006538	A1	20000210	WO 1999-US17347	199907 29

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CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN,  
IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD,  
MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI,  
SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM,  
AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE,  
DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ,  
CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

AU 9953293	A1	20000221	AU 1999-53293	199907 29
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PRIORITY APPLN. INFO.:		US 1998-127468	B2	199807 31

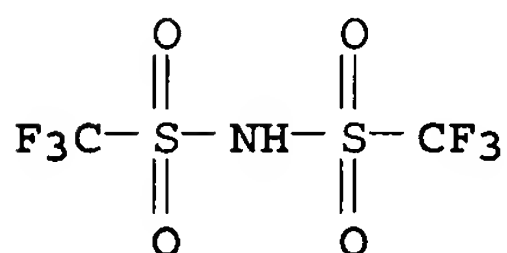
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		US 1998-205873	A	199812 04

			<--	
		WO 1999-US17347	W	199907 29

<--  
AB Provided are methods of purifn. of an org. lithium  
salt comprising the steps of: (a) dissolving an impure org.  
lithium salt in a soln. comprising an org.

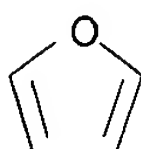
complexing solvent; (b) crystg. from said soln. a solid solvate complex comprising said **lithium salt** and said org. complexing solvent; (c) sepg. said solid solvate complex from said soln.; (d) dissocg. said solid solvate complex to yield: (i) said **lithium salt** in a solid form, and, (ii) a volatile compn. comprising said org. complexing solvent; and, (e) removing said volatile compn. to yield said **lithium salt** in a solid form of purity greater than the purity of said impure **lithium salt**. The present invention also pertains to **electrolytes** for elec. current producing cells comprising such purified **lithium salts**. Thus, (CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>NLi was purified by crystn. of the 1,4-dioxane complex and heating under vacuum at 125° to remove the dioxane.

IT 90076-65-6P, Lithium bis(trifluoromethylsulfonyl)imide  
 RL: DEV (Device component use); PUR (Purification or recovery); PREP (Preparation); USES (Uses)  
 (purifn. by crystn. of ether complex for use as **battery electrolyte**)  
 RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 110-00-9, Furan  
 RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
 (purifn. of org. **lithium salts** by ether complexation, crystn. and removal)  
 RN 110-00-9 HCAPLUS  
 CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)

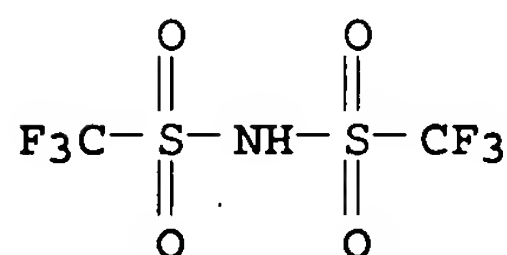


IT 7439-93-2DP, Lithium, salts, preparation  
 RL: PUR (Purification or recovery); PREP (Preparation)  
 (purifn. of org. **lithium salts** by ether complexation, crystn. and removal)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

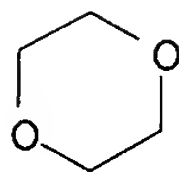


IT 344563-88-8P 344563-90-2P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)  
 (purifn. of org. lithium salts by ether  
 complexation, crystn. and removal)  
 RN 344563-88-8 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt, compd. with 1,4-dioxane (2:3) (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 90076-65-6  
 CMF C2 H F6 N O4 S2 . Li

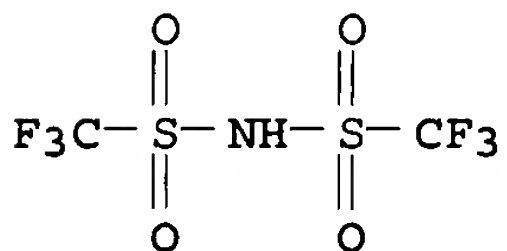


● Li

CM 2  
 CRN 123-91-1  
 CMF C4 H8 O2

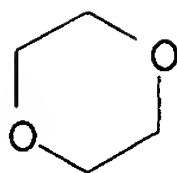


RN 344563-90-2 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt, compd. with 1,4-dioxane (1:2) (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 90076-65-6  
 CMF C2 H F6 N O4 S2 . Li



● Li

CM 2

CRN 123-91-1  
CMF C4 H8 O2

IC ICM C07D281-02  
ICS C07D207-36  
INCL 540544000  
CC 21-2 (General Organic Chemistry)  
Section cross-reference(s): 52  
ST org lithium salt purifn ether complexation;  
electrolyte lithium salt purifn  
IT Ethers, reactions  
RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
(complexation of ethers with lithium for purifn. of org. lithium salts)  
IT Phenols, preparation  
Sulfonamides  
RL: PUR (Purification or recovery); PREP (Preparation)  
(lithium salts)  
IT Carboxylic acids, preparation  
Sulfonic acids, preparation  
RL: PUR (Purification or recovery); PREP (Preparation)  
(lithium salts; purifn. of org. lithium salts by ether complexation, crystn. and removal)  
IT Battery electrolytes  
(purifn. of lithium bis(trifluoromethanesulfonyl)imide for use as battery electrolyte)  
IT 90076-65-6P, Lithium bis(trifluoromethylsulfonyl)imide  
RL: DEV (Device component use); PUR (Purification or recovery); PREP (Preparation); USES (Uses)  
(purifn. by crystn. of ether complex for use as battery electrolyte)  
IT 60-29-7, Diethyl ether, reactions 108-20-3, Diisopropyl ether  
109-99-9, Tetrahydrofuran, reactions 110-00-9, Furan  
110-87-2, Dihydropyran 111-43-3, Dipropyl ether 115-10-6,  
Dimethyl ether 123-91-1, 1,4-Dioxane, reactions 142-68-7,  
Tetrahydropyran 142-96-1, Dibutyl ether 505-68-0, 1,4-Dioxepane  
540-67-0, Ethyl methyl ether 557-17-5, Methyl propyl ether  
592-90-5, Oxepane 598-53-8, Methyl isopropyl ether 628-28-4,  
Methyl butyl ether 929-56-6, Methyl octyl ether 1634-04-4,  
Methyl tert-butyl ether 4747-07-3, Methyl hexyl ether 6572-91-4,  
1,4-Dioxocane 6572-98-1, Oxocane 10143-60-9, Di(2-ethylhexyl)  
ether 13423-15-9, 3-Methyltetrahydrofuran  
RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
(purifn. of org. lithium salts by ether complexation, crystn. and removal)  
IT 7439-93-2DP, Lithium, salts, preparation  
RL: PUR (Purification or recovery); PREP (Preparation)

(purifn. of org. lithium salts by ether  
complexation, crystn. and removal)

IT 344563-88-8P 344563-90-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
RACT (Reactant or reagent)

(purifn. of org. lithium salts by ether  
complexation, crystn. and removal)

IT 78-78-4, Isopentane 95-47-6, o-Xylene, uses 96-37-7,  
Methylcyclopentane 98-82-8, Isopropylbenzene 106-42-3, p-Xylene,  
uses 107-83-5, Isohexane 108-38-3, m-Xylene, uses 108-67-8,  
Mesitylene, uses 108-87-2, Methylcyclohexane 108-88-3, Toluene,  
uses 108-90-7, Chlorobenzene, uses 109-66-0, Pentane, uses  
110-54-3, Hexane, uses 110-82-7, Cyclohexane, uses 111-65-9,  
Octane, uses 111-84-2, Nonane 124-18-5, Decane 287-92-3,  
Cyclopentane 291-64-5, Cycloheptane 292-64-8, Cyclooctane  
540-84-1, Isooctane 25321-09-9, Diisopropylbenzene 25321-22-6,  
Dichlorobenzene 25340-17-4, Diethylbenzene 25550-14-5,  
Methylethylbenzene

RL: NUU (Other use, unclassified); USES (Uses)  
(solvent for purifn. of org. lithium salts by  
ether complexation, crystn. and removal)

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L117 ANSWER 10 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:95943 HCAPLUS

DOCUMENT NUMBER: 132:125353

TITLE: Boron compounds as anion binding agents for  
nonaqueous battery  
electrolytes

INVENTOR(S): Lee, Hung Sui; Yang, Xia-oring; McBreen, James;  
Xiang, Caili

PATENT ASSIGNEE(S): Brookhaven Science Associates, USA

SOURCE: U.S., 11 pp.  
CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

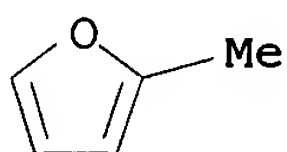
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6022643	A	20000208	US 1997-986846	199712 08
US 6352798	B1	20020305	US 2000-492569	200001 27
PRIORITY APPLN. INFO.:				199712 08

AB Novel fluorinated boron-based compds. which act as anion receptors  
in nonaq. battery electrolytes are provided.  
The anion receptor is a compd. of formula Q3B, where Q is a  
F-bearing moiety selected from the group of (CF3)2CHO,

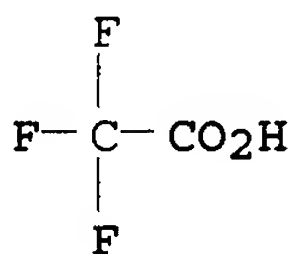
(CF<sub>3</sub>)<sub>2</sub>C(C<sub>6</sub>H<sub>5</sub>)O, (CF<sub>3</sub>)<sub>3</sub>CO, FC<sub>6</sub>H<sub>4</sub>O, F<sub>2</sub>C<sub>6</sub>H<sub>3</sub>O, F<sub>4</sub>C<sub>6</sub>HO, C<sub>6</sub>F<sub>5</sub>O, CF<sub>3</sub>C<sub>6</sub>H<sub>4</sub>O, and (CF<sub>3</sub>)<sub>2</sub>C<sub>6</sub>H<sub>3</sub>O. When added to nonaq. **battery electrolytes**, the fluorinated boron-based compds. of the invention enhance ionic cond. and cation transference no. of nonaq. **electrolytes**. The fluorinated boron-based anion receptors include borane and borate compds. bearing different fluorinated alkyl and aryl groups.

IT 534-22-5, 2-Methylfuran 2923-17-3, Lithium trifluoroacetate 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compd. with carbon, uses 7791-03-9 87187-79-9 87442-01-1, Benzoic acid, pentafluoro-, **lithium salt**  
 RL: DEV (Device component use); USES (Uses)  
 (boron compds. as anion binding agents for nonaq. **battery electrolytes**)

RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 2923-17-3 HCAPLUS  
 CN Acetic acid, trifluoro-, **lithium salt** (8CI, 9CI) (CA INDEX NAME)



● Li

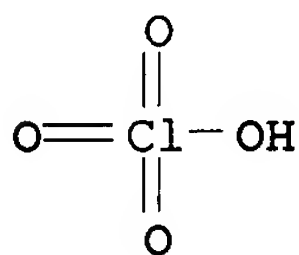
RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, **lithium salt** (8CI, 9CI) (CA INDEX NAME)



● Li

RN 87187-79-9 HCAPLUS

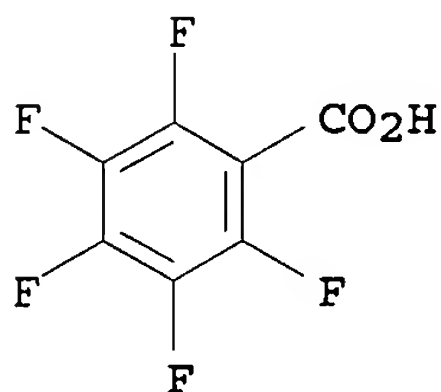
CN Propanoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



● Li

RN 87442-01-1 HCAPLUS

CN Benzoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



● Li

IC ICM H01M006-14

INCL 429324000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery electrolyte** fluorinated boron based  
anion receptorIT **Battery electrolytes**

Ionic conductivity

(boron compds. as anion binding agents for nonaq. **battery electrolytes**)

IT Intercalation compounds

Polyanilines

Polyoxyalkylenes, uses

Transition metal chalcogenides

Transition metal oxides

RL: DEV (Device component use); USES (Uses)

(boron compds. as anion binding agents for nonaq. **battery electrolytes**)

IT Oxides (inorganic), uses

RL: DEV (Device component use); USES (Uses)

(intercalation compd. with lithium; boron compds. as anion binding agents for nonaq. **battery electrolytes**)

- IT Secondary **batteries**  
(lithium; boron compds. as anion binding agents for nonaq. **battery electrolytes**)
- IT Polysulfides  
RL: DEV (Device component use); USES (Uses)  
(org.; boron compds. as anion binding agents for nonaq. **battery electrolytes**)
- IT Lithium alloy  
RL: DEV (Device component use); USES (Uses)  
(boron compds. as anion binding agents for nonaq. **battery electrolytes**)
- IT 75-05-8, Acetonitrile, uses 96-48-0,  $\gamma$ -Butyrolactone  
96-49-1, Ethylene carbonate 107-31-3, Methyl formate 108-32-7,  
Propylene carbonate 109-87-5, Dimethoxymethane 109-99-9, uses  
110-71-4, 1,2-Dimethoxyethane 115-10-6, Dimethyl ether 126-33-0,  
Sulfolane 534-22-5, 2-Methylfuran 616-38-6, Dimethyl  
carbonate 646-06-0, 1,3-Dioxolane 872-50-4, uses 1072-47-5,  
1,3-Dioxolane, 4-Methyl 1072-71-5, 2,5-Dimercapto-1,3,4-  
thiadiazole 2923-17-3, Lithium trifluoroacetate  
7439-93-2, Lithium, uses 7439-93-2D, Lithium,  
intercalation compd. with carbon, uses 7440-44-0D, Carbon,  
intercalation compd. with lithium, uses 7447-41-8, Lithium  
chloride, uses 7550-35-8, Lithium bromide 7789-24-4, Lithium  
fluoride, uses 7791-03-9 9011-17-0, Hexafluoropropylene-  
vinylidene fluoride copolymer 10377-51-2, Lithium iodide  
12031-65-1, Lithium nickel oxide  $\text{LiNiO}_2$  12057-17-9, Lithium  
manganese oxide  $\text{LiMn}_2\text{O}_4$  12162-79-7, Lithium manganese oxide  $\text{LiMnO}_2$   
12190-79-3, Cobalt lithium oxide  $\text{CoLiO}_2$  12201-18-2, Lithium  
molybdenum sulfide  $\text{LiMoS}_2$  14283-07-9, Lithium tetrafluoroborate  
18424-17-4, Lithium hexafluoroantimonate 19836-78-3,  
3-Methyl-2-oxazolidinone 21324-40-3, Lithium hexafluorophosphate  
25014-41-9, Polyacrylonitrile 25233-30-1, Polyaniline 25322-68-3  
25948-29-2, Carbon disulfide, homopolymer 29935-35-1, Lithium  
hexafluoroarsenate 39448-96-9, Graphite lithium 55326-82-4,  
Lithium titanium sulfide  $\text{LiTiS}_2$  55886-04-9, Lithium niobium  
selenide  $\text{Li}_3\text{NbSe}_3$  87187-79-9 87442-01-1, Benzoic  
acid, pentafluoro-, lithium salt 138187-48-1,  
Lithium vanadium oxide  $\text{Li}_1.2\text{V}_2\text{O}_5$  256345-13-8, Lithium vanadium  
oxide ( $\text{Li}_{2.5}\text{V}_6\text{O}_{13}$ )  
RL: DEV (Device component use); USES (Uses)  
(boron compds. as anion binding agents for nonaq. **battery electrolytes**)
- IT 121-43-7 659-18-7 755-53-3 856-46-2 1095-03-0 1109-15-5  
6919-80-8 32766-52-2 146355-12-6 210834-28-9 210834-35-8  
210834-37-0 210834-40-5 210834-42-7  
RL: MOA (Modifier or additive use); TEM (Technical or engineered  
material use); USES (Uses)  
(boron compds. as anion binding agents for nonaq. **battery electrolytes**)

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L117 ANSWER 11 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1999:497044 HCAPLUS  
DOCUMENT NUMBER: 131:104539  
TITLE: Secondary **batteries** with hybrid

inorganic-organic electrodes formed from  
conductive polymers and active inorganic  
substances

INVENTOR(S): Gomez Romero, Pedro; Lira Cantu, Monica; Casan  
Pastor, Nieves

PATENT ASSIGNEE(S): Consejo Superior de Investigaciones Cientificas,  
Spain

SOURCE: Span., 11 pp.  
CODEN: SPXXAD

DOCUMENT TYPE: Patent

LANGUAGE: Spanish

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
ES 2120324	A1	19981016	ES 1995-599	199503 27
ES 2120324	B1	19990701	ES 1995-599	199503 27

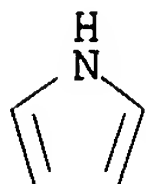
PRIORITY APPLN. INFO.: <--

AB The secondary **batteries** contain a lithium or lithium alloy anode, an **electrolyte**, and a hybrid cathode. The hybrid cathode consists of a conductive polymer doped with an inorg. substance having oxidn.-redn. capacity. The anode may also be a hybrid electrode. The **battery** can be used in elec. vehicles, household appliances, sensors and in the fields of catalysis and electrocatalysis. In an example, the **battery** comprised a Li anode, a polypropylene separator impregnated with a soln. of LiClO<sub>4</sub> in propylene carbonate, and a polypyrrole/H<sub>3</sub>PMo<sub>12</sub>O<sub>40</sub> cathode.

IT 109-97-7D, Pyrrole, polymers 7439-93-2, Lithium, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(secondary **batteries** with hybrid electrodes contg. conductive polymers and active inorg. substances)

RN 109-97-7 HCAPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)



RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

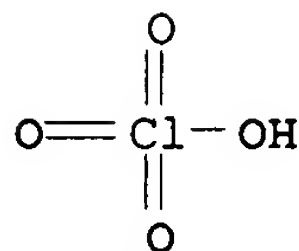
Li

IT 7791-03-9, Lithium perchlorate

RL: NUU (Other use, unclassified); USES (Uses)  
 (secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC ICM H01M004-36

ICS H01M004-60

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 47, 67

ST secondary **battery** hybrid polymer cathode; lithium  
 secondary **battery** hybrid cathode; cathode hybrid org inorg  
 secondary **battery**

IT Electric appliances

Electric vehicles

Sensors

(**batteries** for; secondary **batteries** with  
 hybrid electrodes contg. conductive polymers and active inorg.  
 substances)

IT Catalysis

(electrocatalysis, **batteries** for; secondary  
**batteries** with hybrid electrodes contg. conductive  
 polymers and active inorg. substances)

IT Secondary **batteries**

(lithium; secondary **batteries** with hybrid electrodes  
 contg. conductive polymers and active inorg. substances)

IT **Battery** cathodes

**Battery** electrodes

Conducting polymers

Secondary **batteries**

(secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)

IT Cyanides (inorganic), uses

Heteropoly acids

Oxides (inorganic), uses

Polyanilines

Sulfides, uses

RL: DEV (Device component use); TEM (Technical or engineered  
 material use); USES (Uses)

(secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)

IT Lithium alloy

RL: DEV (Device component use); TEM (Technical or engineered  
 material use); USES (Uses)

(secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)

IT 62-53-3D, Aniline, polymers 106-50-3D, p-Phenylenediamine,  
 polymers 109-97-7D, Pyrrole, polymers 275-51-4D,



Azulene, polymers 1313-13-9, Manganese oxide MnO<sub>2</sub>, uses  
 1313-27-5, Molybdenum oxide MoO<sub>3</sub>, uses 1314-35-8, Tungsten oxide  
 WO<sub>3</sub>, uses 1314-62-1, Vanadium oxide V<sub>2</sub>O<sub>5</sub>, uses 1317-33-5,  
 Molybdenum sulfide MoS<sub>2</sub>, uses 1317-38-0, Copper oxide CuO, uses  
 7439-93-2, Lithium, uses 12026-57-2, H<sub>3</sub>PMo12O<sub>40</sub>  
 12031-65-1, Lithium nickel oxide LiNiO<sub>2</sub> 12036-22-5, Tungsten oxide  
 WO<sub>2</sub> 12037-42-2, Vanadium oxide V<sub>6</sub>O<sub>13</sub> 12039-13-3, Titanium  
 sulfide TiS<sub>2</sub> 12057-17-9, Lithium manganese oxide LiMn<sub>2</sub>O<sub>4</sub>  
 12190-79-3, Lithium cobalt oxide LiCoO<sub>2</sub> 18868-43-4, Molybdenum  
 oxide MoO<sub>2</sub> 25168-37-0, Poly(p-phenylenediamine) 25233-30-1,  
 Polyaniline 30604-81-0, Polypyrrole 39448-96-9, Graphite, compd.  
 with lithium 72785-69-4, Lithium alloy, Li,Al 82451-56-7,  
 Polyazulene

RL: DEV (Device component use); TEM (Technical or engineered  
 material use); USES (Uses)

(secondary batteries with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)

IT 60-00-4, EDTA, uses 67-42-5, EGTA 75-05-8, Acetonitrile, uses  
 108-32-7, Propylene carbonate 139-13-9 482-54-2,  
 Cyclohexanediaminetetraacetic acid 4408-81-5, PDTA 7601-90-3,  
 Perchloric acid, uses 7664-93-9, Sulfuric acid, uses 7727-54-0,  
 Ammonium persulfate 7791-03-9, Lithium perchlorate

RL: NUU (Other use, unclassified); USES (Uses)

(secondary batteries with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)

L117 ANSWER 12 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:437343 HCAPLUS

DOCUMENT NUMBER: 127:196790

TITLE: Polymers and copolymers of pyrrole and thiophene  
 as electrodes in lithium cells

AUTHOR(S): Sanchez De Pinto, M. I.; Mishima, H. T.; Lopez  
 De Mishima, B. A.

CORPORATE SOURCE: Inst. Cs. Quimicas, F.A.A., Univ. Nacional  
 Santiago de Estero, Santiago del Estero, 4200,  
 Argent.

SOURCE: Journal of Applied Electrochemistry (  
 1997), 27(7), 831-838

CODEN: JAELEBJ; ISSN: 0021-891X

PUBLISHER: Chapman & Hall

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The performance of pyrrole and thiophene polymer electrodes in  
 lithium cells was examd. in the lithium perchlorate-propylene  
 carbonate electrolyte by cyclic voltammetry. Polypyrrole  
 films were synthesized in 'wet' and 'dry' conditions; pyrrole and  
 thiophene copolymers were prepd. at different potentials and  
 bilayers were prepd. by sequential deposition of polythiophene (PTh)  
 and polypyrrole (PPy) films. The polymers were cycled between 2.0 V  
 and 4.0 V in the lithium cells. The effects of disconnecting the  
 electrodes from the cell on the behavior of the polymers regarding  
 doping and coulombic efficiency were also studied. The cycling  
 performance of the 'wet' PPy is better than 'dry' PPy, bilayer  
 PTh/PPy and copolymers. No mixed behavior was obsd. for a bilayer  
 where the inner layer was polythiophene and the outer layer was  
 polypyrrole with a thickness PPy/PTh ratio equal to ten. The  
 copolymer prepd. at 3.9 V vs. Li/Li<sup>+</sup> showed the higher energy  
 capacity in W h kg<sup>-1</sup> calcd. from the anodic charge.

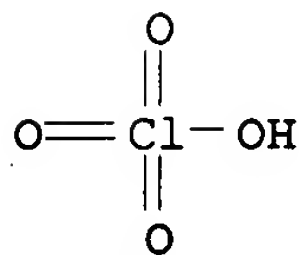
IT 7791-03-9, Lithium perchlorate

RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)

(cyclic voltammetry of polypyrrole and polypyrrole-polythiophene bilayers and pyrrole-thiophene copolymers in lithium perchlorate-propylene carbonate electrolyte)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



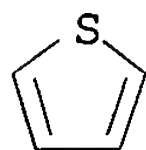
● Li

IT 110-02-1, Thiophene

RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. with and without pyrrole in lithium perchlorate-propylene carbonate electrolyte)

RN 110-02-1 HCAPLUS

CN Thiophene (8CI, 9CI) (CA INDEX NAME)

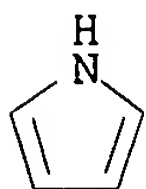


IT 109-97-7, Pyrrole

RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. with and without thiophene in lithium perchlorate-propylene carbonate electrolyte)

RN 109-97-7 HCAPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses

RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(polymers and copolymers of pyrrole and thiophene as electrodes in lithium cells)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 72-2 (Electrochemistry)

Section cross-reference(s): 35, 36, 52

IT Polymerization

(electrochem.; of pyrrole and thiophene and pyrrole with

- thiophene in lithium perchlorate-propylene carbonate  
**electrolyte**)
- IT Cyclic voltammetry  
(of polypyrrole and polypyrrole-polythiophene bilayers and  
pyrrole-thiophene copolymers in lithium perchlorate-propylene  
carbonate **electrolyte**)
- IT **Battery** cathodes  
**Battery** electrodes  
(polypyrrole and polypyrrole-polythiophene bilayers and  
pyrrole-thiophene copolymers)
- IT 89298-12-4, Pyrrole-thiophene copolymer  
RL: DEV (Device component use); PRP (Properties); RCT (Reactant);  
RACT (Reactant or reagent); USES (Uses)  
(cyclic voltammetry in lithium perchlorate-propylene carbonate  
**electrolyte**: polymers and copolymers of pyrrole and  
thiophene as electrodes in lithium cells)
- IT 7791-03-9, Lithium perchlorate  
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
(cyclic voltammetry of polypyrrole and polypyrrole-polythiophene  
bilayers and pyrrole-thiophene copolymers in lithium  
perchlorate-propylene carbonate **electrolyte**)
- IT 30604-81-0, Polypyrrole  
RL: DEV (Device component use); PRP (Properties); RCT (Reactant);  
RACT (Reactant or reagent); USES (Uses)  
(cyclic voltammetry of polypyrrole and polypyrrole-polythiophene  
bilayers in lithium perchlorate-propylene carbonate  
**electrolyte**: polymers and copolymers of pyrrole and  
thiophene as electrodes in lithium cells)
- IT 25233-34-5, Polythiophene  
RL: DEV (Device component use); PRP (Properties); RCT (Reactant);  
RACT (Reactant or reagent); USES (Uses)  
(cyclic voltammetry of polypyrrole-polythiophene bilayers in  
lithium perchlorate-propylene carbonate **electrolyte**:  
polymers and copolymers of pyrrole and thiophene as electrodes in  
lithium cells)
- IT 110-02-1, Thiophene  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. with and without pyrrole in lithium  
perchlorate-propylene carbonate **electrolyte**)
- IT 109-97-7, Pyrrole  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. with and without thiophene in lithium  
perchlorate-propylene carbonate **electrolyte**)
- IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(polymers and copolymers of pyrrole and thiophene as electrodes  
in lithium cells)

L117 ANSWER 13 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:129574 HCAPLUS

DOCUMENT NUMBER: 126:133588

TITLE: Nonaqueous **electrolyte**

**batteries** using **electrolytes**

containing self discharge inhibitors

INVENTOR(S): Jinno, Maruo; Uehara, Mayumi; Sakurai, Atsushi;

Nishio, Koji; Saito, Toshihiko

PATENT ASSIGNEE(S): Sanyo Denki Kk, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08321312	A2	19961203	JP 1995-150844	19950524

PRIORITY APPLN. INFO.:

<--  
JP 1995-150844  
19950524

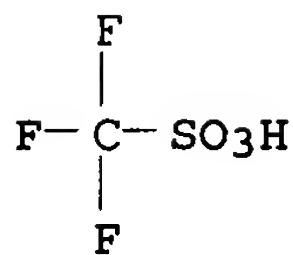
<--  
AB Li batteries use electrolytes contg. LiCF<sub>3</sub>SO<sub>3</sub> or LiPF<sub>6</sub> dissolved in high dielec. const. solvent selected from ethylene carbonate, propylene carbonate, and butylene carbonate; where the electrolytes contain 1-20 vol.% additive selected from triethylamine, n-butylamine, aniline, tri-Me hydroxylamine, 1-dimethylamino-2-methoxy ethane, acetonitrile, acrylonitrile, 3-methoxy propionitrile, benzonitrile, nitromethane, nitroethane, N,N-dimethylacetamide, N,N-dimethylformamide, formamide, N-methyl-2-pyrrolidone, N,N'-dimethyl imidazolidinone, isoxazole, 3,5-di-Me isoxazole, 3-methyl-2-oxazolidone, 1,2,3-oxadiazole, N-Me morpholine, di-Me sulfide, Et Me sulfide, 2-Me thiophene, 1-butane thiol, benzenethiol, di-Me sulfate, di-Et sulfate, di-Me sulfite, di-Et sulfite, butadienesulfone, 3-Me sulfolene, 1,4-thioxane, phenoxathiin, 1,4-thiazine, thiomorpholine, pyridine, 1,3-dimethyl-2-imidazolidinone, DMSO, di-Me sulfone, Me Et sulfonate, and di-Me sulfinite. The electrolytes may contain 1,2-dimethoxyethane. Since the additives react with Li in anodes and the solvents and the solutes in the electrolytes to form coatings on the anodes for prevention of the reaction between the electrolytes and the anodes, the batteries have improved storage property. These batteries have long shelf life.

IT 7439-93-2, Lithium, uses 33454-82-9, Lithium trifluoromethanesulfonate  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte solns. contg. self discharge inhibitors for lithium batteries)

RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

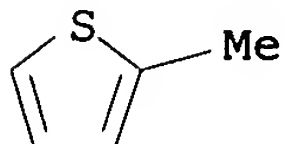
Li

RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 554-14-3, 2-Methylthiophene  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (self discharge inhibitors in nonaq. electrolyte solns.  
 for lithium batteries)  
 RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-16  
 ICS H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery electrolyte self discharge inhibitor  
 IT Battery electrolytes  
 (self discharge inhibitors in nonaq. electrolyte solns.  
 for lithium batteries)  
 IT 7439-93-2, Lithium, uses 21324-40-3, Lithium  
 hexafluorophosphate 33454-82-9, Lithium  
 trifluoromethanesulfonate  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte solns. contg. self discharge  
 inhibitors for lithium batteries)  
 IT 62-53-3, Aniline, uses 64-67-5, Diethyl sulfate 67-68-5,  
 Dimethylsulfoxide, uses 67-71-0, Dimethylsulfone 68-12-2,  
 N,N-Dimethylformamide, uses 75-05-8, Acetonitrile, uses 75-12-7,  
 Formamide, uses 75-18-3, Dimethylsulfide 75-52-5, Nitromethane,  
 uses 77-78-1, Dimethyl sulfate 79-24-3, Nitroethane 80-73-9,  
 N,N'-Dimethylimidazolidinone 100-47-0, Benzonitrile, uses  
 107-13-1, Acrylonitrile, uses 108-98-5, Benzenethiol, uses  
 109-02-4, N-Methylmorpholine 109-73-9, n-Butylamine, uses  
 109-79-5, 1-Butanethiol 110-67-8, 3-Methoxypropionitrile  
 110-86-1, Pyridine, uses 121-44-8, Triethylamine, uses 123-90-0,  
 Thiomorpholine 127-19-5, N,N-Dimethylacetamide 262-20-4,  
 Phenoxathiin 288-14-2, Isoxazole 288-43-7, 1,2,3-Oxadiazole  
 290-56-2, 1,4-Thiazine 290-57-3, 1,4-Thiazine 300-87-8,  
 3,5-Dimethylisoxazole 554-14-3, 2-Methylthiophene  
 616-42-2, Dimethyl sulfite 623-81-4, Diethyl sulfite 624-89-5,  
 Ethylmethylsulfide 666-15-9 872-50-4, N-Methyl-2-pyrrolidone,  
 uses 1193-10-8, 3-Methylsulfolene 1912-28-3, Methyl ethyl  
 sulfonate 3030-44-2 5669-39-6, Trimethylhydroxylamine  
 15980-15-1, 1,4-Thioxane 19836-78-3 28452-93-9, Butadienesulfone  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES

(Uses)

(self discharge inhibitors in nonaq. **electrolyte** solns.  
for lithium **batteries**)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
110-71-4, 1,2-Dimethoxyethane 4437-85-8, Butylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(solvents for nonaq. **electrolyte** solns. contg. self  
discharge inhibitors for lithium **batteries**)

L117 ANSWER 14 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:560789 HCAPLUS

DOCUMENT NUMBER: 125:226559

TITLE: Solid polymer **electrolyte** having  
increased conductivity and solid-state  
**battery** including this  
**electrolyte**

INVENTOR(S): Walker, Charles W. , Jr.; Plichta, Edward J.;  
Behl, Wishvender K.

PATENT ASSIGNEE(S): United States Dept. of the Army, USA

SOURCE: Statutory Invent. Regist., 3 pp.

CODEN: SRXXEV

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 1576	H1	19960806	US 1994-315213	199403 07

PRIORITY APPLN. INFO.:

<--  
US 1994-315213199403  
07

AB The **electrolyte** includes a soln. of  $\geq 1$  Li  
**salt** in  $\geq 1$  polymer host and a dispersion of a Li  
ion-conducting solid ceramic material  $\text{Li}_{3+x}\text{Ge}_x\text{V}_{1-x}\text{O}_4$  ( $x = 0.2-0.8$ )  
or  $\text{Li}_{3.6}\text{Ge}_{0.6}\text{V}_{0.4}\text{O}_4$ . A solid-state **battery** comprises Li,  
Li alloy, or Li-intercalating compd. anode; an electrochem. active  
metallic inorg. compd. cathode; and the invention  
**electrolyte**.

IT 7439-93-2D, Lithium, polymer complexes  
RL: DEV (Device component use); USES (Uses)  
(**battery electrolyte** contg. dispersed  
germanium lithium vanadium oxide)

RN 7439-93-2 HCAPLUS

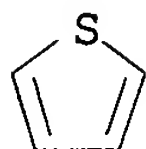
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 110-02-1D, Thiophene, alkyl derivs., polymers, lithium  
complexes  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**battery electrolyte** contg. dispersed  
germanium lithium vanadium oxide)



RN 110-02-1 HCAPLUS  
 CN Thiophene (8CI, 9CI) (CA INDEX NAME)

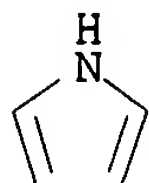


IC ICM H01M006-16  
 INCL 429192000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38, 57  
 ST **battery electrolyte** lithium polymer complex  
 oxide; germanium vanadium lithium oxide **battery**  
**electrolyte**  
 IT **Battery electrolytes**  
 (polymer-lithium complexes contg. dispersed germanium lithium  
 vanadium oxide)  
 IT 7439-93-2D, Lithium, polymer complexes 25322-68-3D, PEO,  
 lithium complexes  
 RL: DEV (Device component use); USES (Uses)  
 (battery electrolyte contg. dispersed  
 germanium lithium vanadium oxide)  
 IT 110-02-1D, Thiophene, alkyl derivs., polymers, lithium  
 complexes 9033-83-4D, Polyphenylene, lithium complexes  
 25067-58-7D, Polyacetylene, lithium complexes 25233-30-1D,  
 Polyaniline, lithium complexes 33411-63-1D, Thiophenol polymer,  
 lithium complexes  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (battery electrolyte contg. dispersed  
 germanium lithium vanadium oxide)  
 IT 111418-37-2, Germanium lithium vanadium oxide (Ge<sub>0.6</sub>Li<sub>3.6</sub>V<sub>0.4</sub>O<sub>4</sub>)  
 156166-24-4, Germanium lithium vanadium oxide (Ge<sub>0.2-0.8</sub>Li<sub>3.2-</sub>  
 3.8V<sub>0.2-0.8</sub>O<sub>4</sub>)  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (battery electrolyte from polymer-lithium  
 complexes contg. dispersed)

L117 ANSWER 15 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1995:972683 HCAPLUS  
 DOCUMENT NUMBER: 124:39959  
 TITLE: Impedance analysis of electronically conducting  
 polymers  
 AUTHOR(S): Ferloni, P.; Mastragostino, M.; Meneghello, L.  
 CORPORATE SOURCE: Dep. Physical Chemistry, Pavia Univ., Pavia,  
 27100, Italy  
 SOURCE: Electrochimica Acta (1996), 41(1),  
 27-33  
 CODEN: ELCAAV; ISSN: 0013-4686  
 PUBLISHER: Elsevier  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The authors discuss in detail the equiv. circuits used to model the  
 impedance of electronically conducting polymer systems and the  
 procedure for the impedance anal. of these systems to account for  
 deviation from the ideal behavior. Impedance spectra of  
 pyrrole-based and thiophene-based polymers of different thickness  
 and at different values of injected charge in cells with  
 liq. electrolytes and solid polymer electrolytes

are reported, and the electrochem. parameters are evaluated and discussed.

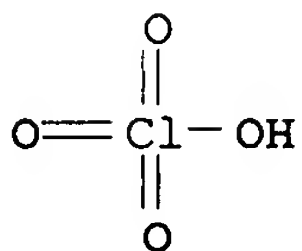
IT 109-97-7, Pyrrole  
 RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
 (electrochem. polymn. on stainless steel in acetonitrile contg. LiClO<sub>4</sub>)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



IT 7439-93-2D, Lithium, PEO complex  
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
 (electrolyte in solid state cell with conducting polymer in impedance anal. study)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)  
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
 (electrolyte with PEO in solid state cell with conducting polymer in impedance anal. study)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 72-2 (Electrochemistry)  
 Section cross-reference(s): 35, 36, 76  
 IT 109-97-7, Pyrrole 132387-61-2, N-(3,6-Dioxaheptyl)pyrrole  
 RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
 (electrochem. polymn. on stainless steel in acetonitrile contg. LiClO<sub>4</sub>)  
 IT 7439-93-2D, Lithium, PEO complex 25322-68-3D, PEO, lithium complex  
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
 (electrolyte in solid state cell with conducting polymer in impedance anal. study)



IT 108-32-7, Propylene carbonate  
RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
(Properties); USES (Uses)  
(electrolyte with LiClO4 in cell with conducting  
polymer in impedance anal. study)

IT 25322-68-3, PEO  
RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
(Properties); USES (Uses)  
(electrolyte with LiClO4 in solid state cell with  
conducting polymer in impedance anal. study)

IT 7791-03-9, Lithium perchlorate (LiClO4)  
RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
(Properties); USES (Uses)  
(electrolyte with PEO in solid state cell with  
conducting polymer in impedance anal. study)

L117 ANSWER 16 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1995:869783 HCAPLUS

DOCUMENT NUMBER: 123:261775

TITLE: Nonaqueous-electrolyte  
batteries with improved  
electrolyte solutions for suppression of  
self discharge

INVENTOR(S): Suemori, Atsushi; Shoji, Yoshihiro; Nishio,  
Koji; Saito, Toshihiko

PATENT ASSIGNEE(S): Sanyo Electric Co, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07192756	A2	19950728	JP 1993-327899	199312 24
				<--
PRIORITY APPLN. INFO.:				JP 1993-327899
				199312 24
				<--

AB The **batteries** consist of cathodes and Li anodes and  
**electrolytes** contg. LiPF6, LiClO4, LiCF3SO3, LiBF4, LiAsF6,  
and/or LiN(CF3SO2)2 and solvents contg. ethylene carbonate,  
propylene carbonate, butylene carbonate, vinylene carbonate,  
1,2-dimethoxyethane, di-Me carbonate, di-Et carbonate, Et Me  
carbonate, THF, and/or 1,3-dioxolane, where the **electrolyte**  
solns. are added with furan resins. The furan resins may be  
phenol-furfural resins, furfural-acetone resins, furfuryl alc.  
resins, and/or their derivs. The **batteries** suppress self  
discharge and have good storage stability.

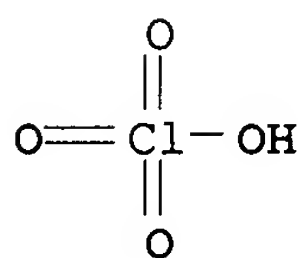
IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); USES (Uses)  
(anode; nonaq. **electrolyte** solns. contg. furan resins  
for Li **batteries** for suppressing self discharge)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

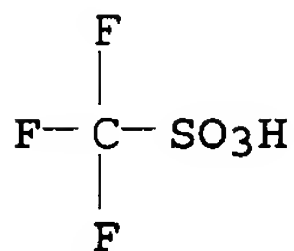
Li

IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium  
 trifluoromethanesulfonate 90076-65-6, Lithium  
 bis(trifluoromethylsulfonyl)amide  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; nonaq. electrolyte solns.  
 contg. furan resins for Li batteries for suppressing  
 self discharge)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



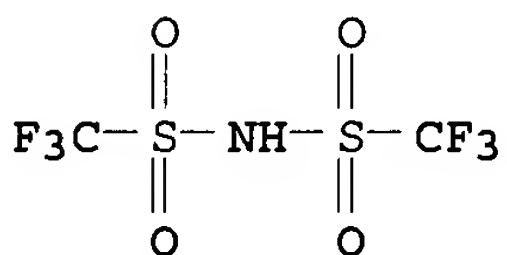
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)



● Li

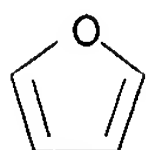
IT 110-00-9D, Furan, derivs., polymers

RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)

(nonaq. **electrolyte** solns. contg. furan resins for Li **batteries** for suppressing self discharge)

RN 110-00-9 HCAPLUS

CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium **battery electrolyte** furan resin

IT **Battery electrolytes**

(nonaq. **electrolyte** solns. contg. furan resins for Li **batteries** for suppressing self discharge)

IT 7439-93-2, Lithium, uses

RL: DEV (Device component use); USES (Uses)

(anode; nonaq. **electrolyte** solns. contg. furan resins for Li **batteries** for suppressing self discharge)

IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium trifluoromethanesulfonate 90076-65-6, Lithium bis(trifluoromethylsulfonyl)amide

RL: DEV (Device component use); USES (Uses)

(**electrolyte**; nonaq. **electrolyte** solns. contg. furan resins for Li **batteries** for suppressing self discharge)

IT 110-00-9D, Furan, derivs., polymers 25212-86-6, Furfuryl alcohol homopolymer 25896-95-1, Acetone-furfural copolymer 26338-61-4, Furfural-phenol copolymer

RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)

(nonaq. **electrolyte** solns. contg. furan resins for Li **batteries** for suppressing self discharge)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, Tetrahydrofuran, uses 110-71-4, 1,2-Dimethoxyethane 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 646-06-0, 1,3-Dioxolan 872-36-6, Vinylene carbonate 4437-85-8, Butylene carbonate

RL: DEV (Device component use); USES (Uses)

(solvent; nonaq. **electrolyte** solns. contg. furan resins for Li **batteries** for suppressing self discharge)

L117 ANSWER 17 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1995:608855 HCAPLUS

DOCUMENT NUMBER: 123:37139

TITLE: Characterization of the lithium-organic **electrolyte** interface containing inorganic and organic additives by in situ techniques

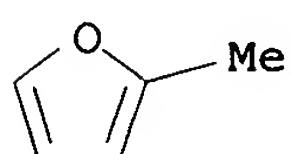
AUTHOR(S): Matsuda, Yoshiharu; Ishikawa, Masashi; Yoshitake, Shinsuke; Morita, Masayuki

CORPORATE SOURCE: Department of Applied Chemistry and Chemical Engineering, Faculty of Engineering, Yamaguchi University, Tokiwadai, Ube, 755, Japan

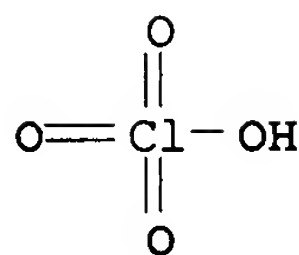
SOURCE: Journal of Power Sources (1995),  
54(2), 301-5  
CODEN: JPSODZ; ISSN: 0378-7753  
PUBLISHER: Elsevier  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB SnI2 and AlI3 additives improved charge/discharge cycling efficiency of a Li electrode in propylene carbonate electrolyte contg. LiClO4. The combination of different types of additive, i.e., the addn. of AlI3 together with 2-methylfuran to the electrolyte, resulted in an excellent cycling efficiency of the Li electrode. The electrochem. behavior of an Li electrode-org. electrolyte interface was investigated by in-situ techniques, e.g., a.c. impedance measurements and scanning vibrating electrode technique. The relation between the Li rechargeability and the interfacial behavior of the Li electrode in the org. electrolyte in the absence and the presence of the additives was discussed.  
IT 7439-93-2, Lithium, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(characterization of lithium electrode-org. electrolyte interface contg. inorg. and org. additives by in-situ techniques)  
RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 534-22-5, 2-Methylfuran  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte contg.; characterization of lithium electrode-org. electrolyte interface contg. inorg. and org. additives by in-situ techniques)  
RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electrolyte contg.; characterization of lithium electrode-org. electrolyte interface contg. inorg. and org. additives by in-situ techniques)  
RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72
- ST lithium electrode **electrolyte** interface characterization;  
tin iodide additive **electrolyte** electrode interface;  
aluminum iodide additive **electrolyte** electrode interface;  
methyلفuran additive **electrolyte** electrode interface;  
**battery** lithium electrode **electrolyte** interface
- IT Interface  
(electrode-**electrolyte**, characterization of lithium  
electrode-org. **electrolyte** interface contg. inorg. and  
org. additives by in-situ techniques)
- IT 7439-93-2, Lithium, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(characterization of lithium electrode-org. **electrolyte**  
interface contg. inorg. and org. additives by in-situ techniques)
- IT 534-22-5, 2-Methyلفuran 7550-35-8, Lithium bromide  
7784-23-8, Aluminum iodide (AlI3) 10294-70-9, Tin iodide (SnI2)  
10377-51-2, Lithium iodide  
RL: MOA (Modifier or additive use); USES (Uses)  
(**electrolyte** contg.; characterization of lithium  
electrode-org. **electrolyte** interface contg. inorg. and  
org. additives by in-situ techniques)
- IT 108-32-7, Propylene carbonate 7791-03-9, Lithium  
perchlorate  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**electrolyte** contg.; characterization of lithium  
electrode-org. **electrolyte** interface contg. inorg. and  
org. additives by in-situ techniques)

L117 ANSWER 18 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1994:413815 HCAPLUS  
DOCUMENT NUMBER: 121:13815  
TITLE: Fluorinated surfactants as additives for lithium  
**batteries**  
AUTHOR(S): Lemordant, D.; Ribes, A. Tudela; Willmann, P.  
CORPORATE SOURCE: Lab. Energ. et React. aux Interfaces, Univ. P.  
et M. Curie, Paris, 75005, Fr.  
SOURCE: Power Sources (1993), 14, 69-80  
CODEN: POSOAN; ISSN: 0743-7137  
DOCUMENT TYPE: Journal  
LANGUAGE: English

- AB The effects of a fluorinated surface active agent tetraethylammonium  
perfluorooctylsulfonate (TEAFOS) on the cycling efficiencies of the  
Li electrode in propylene carbonate (PC)/LiClO4 **electrolyte**  
were studied. Cycling Li on an inert support shows very low  
efficiency in the absence of any additive. Addn. of org. additives  
like benzene or 2-methylthiophene to the **electrolyte** soln.  
improved the coulombic efficiency of Li during deposition/dissoln.

cycles. TEAFOS appears to be a very efficient additive as the quantity (in moles) of surfactant required to obtain the same improvement as benzene, for example, is at least one order of magnitude lower. Organo salts like Li perfluorooctane sulfonate or TEAFOS are sol. in PC and cond. data show that they behave as fully dissocd. salts in highly polar org. solvents like PC. Surprisingly, the variations of the surface tension at the PC/air interface or the contact angle (on glass plates) are apparent only for concn. >0.01 mol/L. In connection with this result, it was found that the efficiency increases with surfactant concn. from 0.01 mol/L up to the concn. of  $\approx 0.05$  mol/L at satn. at room temp. Addn. of 5% of benzene to the **electrolyte** contg. 0.02 mol/L of TEAFOS lead to a further improvement of the cycling efficiency. The mechanism of action of these lipophilic compds. is similar and related to adsorption at interface.

IT 7439-93-2, Lithium, uses

RL: USES (Uses)

(anodes, cycling efficiency of, in **batteries**, effect of fluorinated surfactants in **electrolyte** on)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

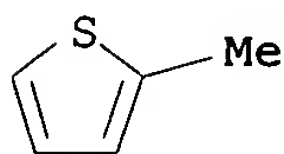
IT 554-14-3, 2-Methylthiophene

RL: USES (Uses)

(**electrolyte** contg., lithium perchlorate, fluorinated surfactants in, for lithium anode cycling efficiency, in **batteries**)

RN 554-14-3 HCAPLUS

CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



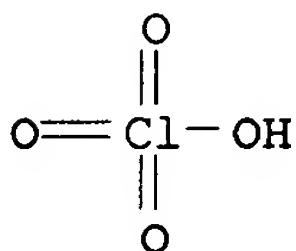
IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)

(**electrolyte**, contg. fluorinated surfactants for lithium anode cycling efficiency, in **batteries**)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 29457-72-5  
RL: USES (Uses)  
(surfactant, **electrolyte** contg., lithium perchlorate,  
for lithium anode cycling efficiency, in **batteries**)  
RN 29457-72-5 HCAPLUS  
CN 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-  
heptadecafluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>S- (CF<sub>2</sub>)<sub>7</sub>-CF<sub>3</sub>

● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST fluorinated surfactant lithium **battery** performance;  
ethylammonium perfluorooctylsulfonate surfactant lithium  
**battery** performance; benzene additive **electrolyte**  
lithium **battery**; methylthiophene additive  
**electrolyte** lithium **battery**  
IT **Battery electrolytes**  
(lithium perchlorate, contg. fluorinated surfactants, for lithium  
anode cycling efficiency, in **batteries**)  
IT Anodes  
(**battery**, lithium, cycling efficiency of, effect of  
fluorinated surfactants in **electrolyte** on)  
IT 7439-93-2, Lithium, uses  
RL: USES (Uses)  
(anodes, cycling efficiency of, in **batteries**, effect of  
fluorinated surfactants in **electrolyte** on)  
IT 71-43-2, Benzene, uses 108-32-7, Propylene carbonate  
554-14-3, 2-Methylthiophene  
RL: USES (Uses)  
(**electrolyte** contg., lithium perchlorate, fluorinated  
surfactants in, for lithium anode cycling efficiency, in  
**batteries**)  
IT 7791-03-9, Lithium perchlorate  
RL: USES (Uses)  
(**electrolyte**, contg. fluorinated surfactants for  
lithium anode cycling efficiency, in **batteries**)  
IT 29457-72-5 56773-42-3, Tetraethylammonium  
perfluorooctylsulfonate 59587-38-1  
RL: USES (Uses)  
(surfactant, **electrolyte** contg., lithium perchlorate,  
for lithium anode cycling efficiency, in **batteries**)

L117 ANSWER 19 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1994:195809 HCAPLUS

DOCUMENT NUMBER: 120:195809

TITLE: DSC studies pertaining to safety related  
chemistry of **secondary Li**  
**cells**

AUTHOR(S): Pasquariello, D. M.; Abraham, K. M.; Willstaedt,  
E. B.; Shen, D. H.; Surampudi, S.

CORPORATE SOURCE: EIC Laboratories Inc., Norwood, MA, 02062, USA

SOURCE: Proceedings - Electrochemical Society (  
1993), (Proceeding of the Symposium on  
Lithium Batteries, 1992), 106-25



CODEN: PESODO; ISSN: 0161-6374

DOCUMENT TYPE: Journal

LANGUAGE: English

AB DSC was used to study the role of components on the safety of **secondary Li/TiS<sub>2</sub> cells**. Cyclic ether/LiAsF<sub>6</sub> **electrolytes** undergo strong exothermic reactions with fresh Li at temps. as low as 140° but cyclic esters do not react at <190°. DSC data from cycled anodes, show that exothermic reactions start at 50° when the **electrolyte** contains cyclic esters and at 100° when cyclic ethers. The difference in reactivity between fresh and cycled Li in the ester **electrolyte** is due to the properties of the passivation layer on the Li surface. DSC data of material removed from a cycled TiS<sub>2</sub> cathode suggests that TiS<sub>2</sub> catalyzes **electrolyte** decompn., but the reaction is not as exothermic as that of the anode. The reactions responsible for the exotherms at the anode and the cathode are important factors for the low heat tolerance of **secondary Li cells**.

IT 7439-93-2, Lithium, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with cyclic ethers and esters in **electrolyte**, effect on safety and heat tolerance of **battery**)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

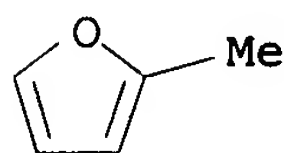
Li

IT 534-22-5, 2-Methyl furan

RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with lithium, in **electrolyte**, effect on safety and heat tolerance of **battery**)

RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST safety lithium **battery** exothermic reaction; ester**electrolyte** reaction lithium anodeIT **Battery electrolytes**

(lithium salts contg. cyclic ethers and  
cyclic ester solvents, exothermic reaction of lithium with)

IT Safety

(of lithium **batteries**, role of exothermic reaction of  
anode with cyclic ethers and esters on)

IT Reaction

(exothermic, of lithium with cyclic ethers and esters, effect of,  
on safety of lithium **battery**)

IT 29935-35-1, Lithium hexafluoroarsenate (LiAsF<sub>6</sub>)

RL: USES (Uses)

(**electrolyte** contg. cyclic ethers or esters and,  
lithium reaction in)



- IT 66594-52-3, Aluminum 20, lithium 80 68968-16-1 77088-52-9,  
Aluminum 15, lithium 85 142241-67-6  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with cyclic ethers and esters in  
**electrolyte**)
- IT 7439-93-2, Lithium, reactions 12039-13-3, Titanium sulfide  
(TiS<sub>2</sub>)  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with cyclic ethers and esters in  
**electrolyte**, effect on safety and heat tolerance of  
**battery**)
- IT 96-47-9, 2-Methyl tetrahydrofuran 96-49-1, Ethylene carbonate  
108-32-7, Propylene carbonate 109-99-9, Tetrahydrofuran, reactions  
112-49-2, Triglyme 534-22-5, 2-Methyl furan 646-06-0,  
Dioxolane  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with lithium, in **electrolyte**, effect on  
safety and heat tolerance of **battery**)

L117 ANSWER 20 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1994:195807 HCAPLUS

DOCUMENT NUMBER: 120:195807

TITLE: Li/LixCoO<sub>2</sub> rechargeable cell:  
influence of **electrolyte** composition  
and additives on performance

AUTHOR(S): Peled, E.; Menachem, C.; Gorenshstein, A.; Alkon,  
A.

CORPORATE SOURCE: Sch. Chem., Tel Aviv Univ., Tel Aviv, 69978,  
Israel

SOURCE: Proceedings - Electrochemical Society (  
1993), 93-24(Proceeding of the Symposium  
on Lithium Batteries, 1992), 68-74  
CODEN: PESODO; ISSN: 0161-6374

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The compatibility of Li anode and LiCoO<sub>2</sub> intercalation cathode with  
4 2-Me-furan (I) **electrolytes** were studied. The  
**electrolytes** were LiAsF<sub>6</sub> in I, LiAsF<sub>6</sub> and LiBF<sub>4</sub> in I, LiAsF<sub>6</sub>  
in I/ di-Me-carbonate (II), and LiAsF<sub>6</sub> and LiBF<sub>4</sub> in I/II. The  
II-free **electrolytes** showed poor compatibility with Li.  
The **electrolyte** contg. LiBF<sub>4</sub> exhibited the best  
compatibility with Li but the poorest compatibility with the LiCoO<sub>2</sub>  
cathode. Modified cathodes were prep'd. by backing CoCO<sub>3</sub>, Li<sub>2</sub>CO<sub>3</sub>,  
and CaCO<sub>3</sub> mixt. with a Li:Ca ratio of 1.0:0.6, at 900°; Ca  
was present as CaO in the final cathode mix. The presence of CaO  
seems to aid in using the **electrolyte** with LiAsF<sub>6</sub>/LiBF<sub>4</sub> in  
I/II which has the best compatibility with Li. The CaO additive led  
to enhanced current efficiency and cathode utilization and slowed  
down the degrdn. rate of cathode materials.

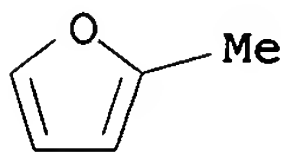
IT 7439-93-2, Lithium, uses  
RL: USES (Uses)  
(anodes, compatibility of **electrolyte** of  
**lithium salts** with 2-Me-furan and  
di-Me-carbonate with)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 534-22-5, 2-Methyl-furan  
RL: USES (Uses)  
(electrolyte contg., lithium anode compatibility with)  
RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72  
ST methyolfuran electrolyte lithium intercalation  
battery; calcium oxide additive intercalation cathode;  
cobalt lithium oxide intercalation cathode  
IT Battery electrolytes  
(lithium salts with 2-Me-furan and  
di-Me-carbonate, anode compatibility with)  
IT Cathodes  
(battery, cobalt lithium oxide, lithium-intercalating,  
additive for stabilization of)  
IT Anodes  
(battery, lithium, compatibility of electrolyte  
of lithium salts with 2-Me-furan and  
di-Me-carbonate with)  
IT 7439-93-2, Lithium, uses  
RL: USES (Uses)  
(anodes, compatibility of electrolyte of  
lithium salts with 2-Me-furan and  
di-Me-carbonate with)  
IT 534-22-5, 2-Methyl-furan 616-38-6, Dimethyl-carbonate  
14283-07-9, Lithium fluoroborate (LiBF<sub>4</sub>) 29935-35-1, Lithium  
hexafluoroarsenate (LiAsF<sub>6</sub>)  
RL: USES (Uses)  
(electrolyte contg., lithium anode compatibility with)

L117 ANSWER 21 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1993:584681 HCAPLUS  
DOCUMENT NUMBER: 119:184681  
TITLE: Behavior of lithium/electrolyte  
interface in organic solutions  
AUTHOR(S): Matsuda, Yoshiharu  
CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
SOURCE: Journal of Power Sources (1993),  
43(1-3), 1-7  
CODEN: JPSODZ; ISSN: 0378-7753  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB The coulombic efficiency of a Li anode in Li salt  
-org. solvent electrolytes was improved by addn. of Mg<sup>2+</sup>,  
Zn<sup>2+</sup>, In<sup>3+</sup>, Ga<sup>3+</sup>, etc. Some org. additives, e.g.,  
2-methylthiophene, 2-methyolfuran, benzene, etc., also improved the  
coulombic efficiency of Li anodes during cycling. The mechanisms of  
these additives are discussed in connection with the structure of  
the electrode/electrolyte interface.  
IT 7439-93-2, Lithium, uses  
RL: USES (Uses)

(anodes, interface of org. **electrolyte** with, effect of additives on)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

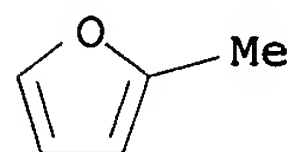
IT 534-22-5, 2-Methyl furan 554-14-3, 2-Methyl thiophene

RL: USES (Uses)

(**electrolyte** contg. org. solvent and **lithium salt** and, **lithium** anode coulombic efficiency in)

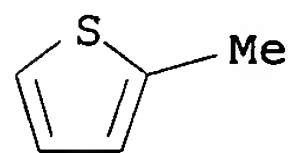
RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS

CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



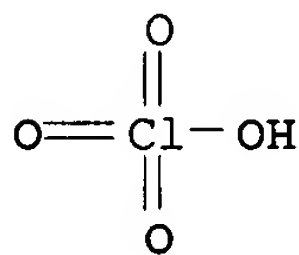
IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)

RL: USES (Uses)

(**electrolyte** contg. org. solvent and, **lithium** anode interface with, effect of additives on)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72

ST lithium anode interface **electrolyte** additive;  
**battery** lithium anode **electrolyte** interface

IT **Battery electrolytes**  
(**lithium salt**-org. solvent, with inorg. and  
org. additives, **lithium** anode interface with)

IT Electric resistance

- (of lithium anode/org. solvent **electrolyte**, effect of additives on)
- IT Anodes  
(**battery**, lithium, interface with additive-contg. lithium salt-org. solvent **electrolyte**, properties of)
- IT Interface  
(electrode-**electrolyte**, lithium anode/org. solvent, effect of additives on)
- IT 7439-93-2, Lithium, uses  
RL: USES (Uses)  
(anodes, interface of org. **electrolyte** with, effect of additives on)
- IT 108-32-7, Propylene carbonate  
RL: USES (Uses)  
(**electrolyte** contg. lithium perchlorate and, lithium anode interface with, effect of additives on)
- IT 71-43-2, Benzene, uses 534-22-5, 2-Methyl furan  
554-14-3, 2-Methyl thiophene 7429-90-5, Aluminum, uses  
7439-95-4, Magnesium, uses 7440-31-5, Tin, uses 7440-55-3, Gallium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses  
RL: USES (Uses)  
(**electrolyte** contg. org. solvent and lithium salt and, lithium anode coulombic efficiency in)
- IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)  
RL: USES (Uses)  
(**electrolyte** contg. org. solvent and, lithium anode interface with, effect of additives on)

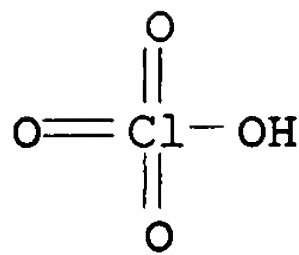
L117 ANSWER 22 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1993:563959 HCAPLUS  
DOCUMENT NUMBER: 119:163959  
TITLE: Electrochemical study of the passivating layer on lithium intercalated carbon electrodes in nonaqueous solvents  
AUTHOR(S): Simon, B.; Boeue, J. P.; Broussely, M.  
CORPORATE SOURCE: Alcatel Alsthom Recherche, Marcoussis, 91640, Fr.  
SOURCE: Journal of Power Sources (1993), 43(1-3), 65-74  
CODEN: JPSODZ; ISSN: 0378-7753  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Passivation of graphitized C electrodes was studied by impedance spectroscopy to det. the double layer capacitance and charge transfer characteristics of Li-intercalated C anodes. The graphitized C films were obtained from polyacrylonitrile. The reactions of **electrolyte** components during the intercalation cycles were studied to det. the origin of the passivating species. Solubilization of the passivating layer in the **electrolyte** appeared to be the main mechanism of self-discharge; several **electrolyte** additives were identified which were efficient for charge retention in button-type Li-C tissue **batteries**.

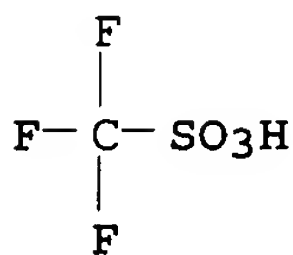
- IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>) 33454-82-9  
RL: USES (Uses)  
(**electrolyte** contg., graphitized carbon anode passivation in)

RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



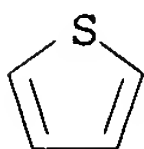
● Li

RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 25154-40-9, Methyl thiophene  
RL: USES (Uses)  
(electrolyte contg., lithium salt  
-org. solvent, graphitized carbon anode passivation in)  
RN 25154-40-9 HCAPLUS  
CN Thiophene, methyl- (7CI, 8CI, 9CI) (CA INDEX NAME)



D1-Me

IT 7439-93-2, Lithium, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(intercalation of, in graphitized carbon anodes, passivating  
layer formation during)  
RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium intercalation graphitized carbon anode; graphitized carbon anode passivation **electrolyte; battery** graphitized carbon anode

IT **Battery electrolytes**  
(**lithium salt**-org. solvent, graphitized carbon anode passivation in, additives for minimization of)

IT Passivation  
(of graphitized carbon anodes during lithium intercalation, **electrolyte** role in)

IT Reduction, electrochemical  
(of **lithium salt**-org. solvent **electrolytes**, in cycling of lithium-intercalating carbon)

IT Anodes  
(**battery**, graphitized carbon, lithium-intercalating, stability of)

IT 7782-42-5P, Graphite, uses  
RL: PREP (Preparation); USES (Uses)  
(anodes, lithium-intercalating, passivating layer on, formation and properties of, for **batteries**)

IT 75-18-3 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 109-99-9, THF, uses 110-71-4, 1,2-Dimethoxyethane **7791-03-9**, Lithium perchlorate ( $\text{LiClO}_4$ ) 29935-35-1, Lithium hexafluoroarsenate ( $\text{LiAsF}_6$ ) **33454-82-9**  
RL: USES (Uses)  
(**electrolyte** contg., graphitized carbon anode passivation in)

IT 124-38-9, Carbon dioxide, uses 306-94-5, Perfluorodecalin 624-91-9, Methyl nitrite 1120-71-4, Propane sultone **25154-40-9**, Methyl thiophene  
RL: USES (Uses)  
(**electrolyte** contg., **lithium salt** -org. solvent, graphitized carbon anode passivation in)

IT 7440-44-0P, Carbon, uses  
RL: PREP (Preparation); USES (Uses)  
(graphitized, anodes, lithium-intercalating, passivating layer on, formation and properties of, for **batteries**)

IT **7439-93-2**, Lithium, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(intercalation of, in graphitized carbon anodes, passivating layer formation during)

L117 ANSWER 23 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1993:542922 HCAPLUS

DOCUMENT NUMBER: 119:142922

TITLE: Lithium insertion into titanium sulfide ( $\text{TiS}_2$ ) from various **electrolytes**

AUTHOR(S): Skundin, A. M.; Stefanovskaya, E. E.; Egorkina, O. Yu.

CORPORATE SOURCE: A. N. Frumkin Inst. Electrochem., Moscow, 117071, Russia

SOURCE: Journal of Power Sources (1993), 43(1-3), 301-6  
CODEN: JPSODZ; ISSN: 0378-7753

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The quasi-equil. behavior of  $\text{TiS}_2$  cathodes in various **electrolytes** was studied, and the galvanostatic switch-on transients in these **electrolytes** were measured. The

**electrolytes** used were: 1M LiCl<sub>4</sub> in propylene carbonate and in  $\gamma$ -butyrolactone (BL), 1M LiBF<sub>4</sub> in BL, and 1M LiAsF<sub>6</sub> in a mixt. of 2-methyltetrahydrofuran and 2-methylfuran. Both the potential of the intercalate LixTiS<sub>2</sub> with fixed x values and the diffusivity of the intercalating species are dependent on the nature of the **electrolyte**.

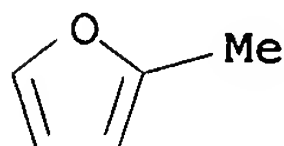
IT 534-22-5, 2-Methylfuran

RL: USES (Uses)

(**electrolyte** contg., lithium hexafluoroarsenate, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)

RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



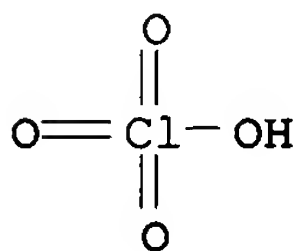
IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)

(**electrolyte**, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 7439-93-2, Lithium, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(intercalation of, in titanium disulfide cathodes during **battery** discharge, **electrolyte** effect on)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72

ST lithium intercalation titanium sulfide cathode **electrolyte**  
; **battery** lithium intercalation titanium sulfide cathode

IT **Battery electrolytes**

(lithium intercalation in titanium sulfide cathodes during discharge in relation to)

IT Cathodes

(**battery**, titanium sulfide, performance of, **electrolyte** effect on)



- IT Inclusion reaction  
(intercalation, electrochem., of lithium, in titanium disulfide cathodes during **battery** discharge, **electrolyte** effect on)
- IT 12039-13-3, Titanium sulfide (TiS<sub>2</sub>)  
RL: USES (Uses)  
(cathodes, performance of, **electrolyte** effect on)
- IT 96-47-9, 2-Methyltetrahydrofuran 534-22-5, 2-Methylfuran  
RL: USES (Uses)  
(**electrolyte** contg., lithium hexafluoroarsenate, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)
- IT 96-48-0,  $\gamma$ -Butyrolactone  
RL: USES (Uses)  
(**electrolyte** contg., lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)
- IT 108-32-7, Propylene carbonate  
RL: USES (Uses)  
(**electrolyte** contg., lithium perchlorate, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)
- IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate (LiBF<sub>4</sub>) 29935-35-1, Lithium hexafluoroarsenate (LiAsF<sub>6</sub>)  
RL: USES (Uses)  
(**electrolyte**, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)
- IT 7439-93-2, Lithium, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(intercalation of, in titanium disulfide cathodes during **battery** discharge, **electrolyte** effect on)

L117 ANSWER 24 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1992:637171 HCAPLUS  
DOCUMENT NUMBER: 117:237171  
TITLE: Secondary lithium **batteries**  
INVENTOR(S): Sugeno, Naoyuki; Anzai, Masanori; Nagaura, Toru  
PATENT ASSIGNEE(S): Sony Corp., Japan  
SOURCE: Eur. Pat. Appl., 18 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 486950	A1	19920527	EP 1991-119471	199111 14
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EP 486950	B1	19940810		
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JP 04184872	A2	19920701	JP 1990-312481	199011 17
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JP 3089662	B2	20000918		



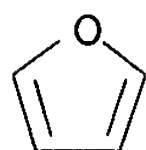
JP 2000268864	A2	20000929	JP 2000-65779	199011 17
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JP 3356157	B2	20021209		
JP 04280082	A2	19921006	JP 1991-67998	199103 07
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JP 3079613	B2	20000821		
CA 2055305	AA	19920518	CA 1991-2055305	199111 12
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CA 2055305	C	20020219		
US 5292601	A	19940308	US 1991-792628	199111 15
			<--	
PRIORITY APPLN. INFO.:			JP 1990-312481	A 199011 17
			<--	
			JP 1991-67998	A 199103 07
			<--	

AB The **batteries** have Li-intercalatable carbonaceous anodes, LixMO2 cathodes (x = 0.5-1, M = Co, Ni, and/or Mn), and **electrolyte** contg. a mixed solvent of 15-75 vol.% propylene carbonate and di-Et and/or di-Pr carbonate. The carbonaceous material is obtained from furan resins and petroleum pitches and has a spacing of (002) planes of  $\geq 3.70$  Å and any DTA exothermic peak at  $\geq 700^\circ$ . The carbonaceous material further comprises 0.2-5.0 wt.% P and 0.2-2.0 wt.% B.

IT 110-00-9D, Furan, derivs., polymers  
RL: USES (Uses)  
(carbonaceous materials from, for lithium-intercalating anodes, in **batteries**)

RN 110-00-9 HCAPLUS

CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses  
RL: USES (Uses)  
(carbonaceous materials intercalated with, anodes, for **batteries**)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IC ICM H01M010-40

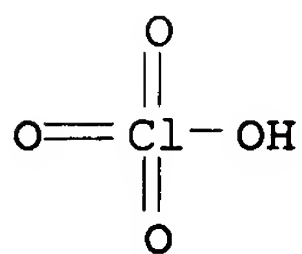
ICS H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium intercalating carbonaceous anode **battery**; nickel  
 lithium oxide **battery** cathode; cobalt lithium oxide  
**battery** cathode; manganese lithium oxide **battery**  
 cathode; phosphorus carbonaceous material lithium anode; boron  
 carbonaceous material lithium anode; diethyl carbonate  
**battery** electrolyte solvent; dipropyl carbonate  
**battery** electrolyte solvent; propylene carbonate  
**battery** electrolyte solvent  
 IT **Battery electrolytes**  
 (lithium salts, solvent mixts. for)  
 IT **Batteries, secondary**  
 (lithium, performance of)  
 IT Carbonaceous materials  
 RL: USES (Uses)  
 (lithium-intercalated, anodes, for **batteries**)  
 IT Cathodes  
 (**battery**, lithium transition metal oxide)  
 IT Anodes  
 (**battery**, lithium-intercalated carbonaceous materials  
 for)  
 IT Pitch  
 (petroleum, lithium-intercalated, anodes, for **batteries**  
 )  
 IT 110-00-9D, Furan, derivs., polymers  
 RL: USES (Uses)  
 (carbonaceous materials from, for lithium-intercalating anodes,  
 in **batteries**)  
 IT 7439-93-2, Lithium, uses  
 RL: USES (Uses)  
 (carbonaceous materials intercalated with, anodes, for  
**batteries**)  
 IT 12031-65-1, Lithium nickel oxide (LiNiO<sub>2</sub>) 12057-17-9, Lithium  
 manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12190-79-3, Cobalt lithium oxide  
 (CoLiO<sub>2</sub>) 56369-20-1, M = Co 123193-61-3, Cobalt lithium oxide  
 (CoLi<sub>0.5</sub>-1O<sub>2</sub>) 123550-86-7, Lithium manganese oxide (Li<sub>0.5</sub>-1MnO<sub>2</sub>)  
 144566-63-2, Lithium nickel oxide (Li<sub>0.5</sub>-1NiO<sub>2</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (cathodes, for secondary lithium **batteries**)  
 IT 105-58-8, Diethyl carbonate 623-96-1, Dipropyl carbonate  
 RL: USES (Uses)  
 (electrolyte solvent contg., propylene carbonate, for  
 lithium **batteries**)  
 IT 108-32-7, Propylene carbonate  
 RL: USES (Uses)  
 (electrolyte solvent, contg. di-Et and/or di-Pr  
 carbonate lithium **batteries**)  
 IT 7440-42-8, Boron, uses 7723-14-0, Phosphorus, uses  
 RL: USES (Uses)  
 (lithium-intercalated carbonaceous anodes contg., for secondary  
**batteries**)

L117 ANSWER 25 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1992:161080 HCAPLUS  
 DOCUMENT NUMBER: 116:161080  
 TITLE: Properties of electrochemically synthesized  
 polymer electrodes. Part VIII. Kinetics of  
 polypyrrole in polymer **electrolyte**  
**cells**

AUTHOR(S): Casagrande, C.; Panero, S.; Prosperi, P.; Scrosati, B.  
 CORPORATE SOURCE: Dip. Chim., Univ. Roma 'La Sapienza', Rome, 00185, Italy  
 SOURCE: Journal of Applied Electrochemistry (1992), 22(3), 195-9  
 CODEN: JAELEBJ; ISSN: 0021-891X  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB Results obtained by cyclic voltammetry and frequency response anal. show that the electrochem. behavior of solid state cells based on the combination of polymer **electrolytes** and polymer cathodes is crucially affected by the morphol. of the electrode interfaces. Fast kinetics and good interfacial contacts can be obtained using composite electrodes electrosynthesized from solns. contg. a polymer **electrolyte** and large surfactant anions.  
 IT 7439-93-2D, Lithium, polyethylene complex  
 RL: PRP (Properties)  
 (electrochem. polymn. of pyrrole in acetonitrile contg. lithium perchlorate and)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

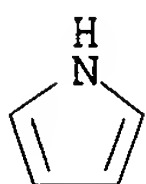
Li

IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (electrochem. polymn. of pyrrole in acetonitrile contg., with or without polyethylene oxide and sodium dodecyl sulfate)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 109-97-7, Pyrrole  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymn. of, electrochem., with polyethylene oxide and sodium dodecyl sulfate)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)

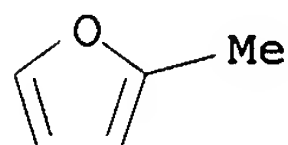




CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 534-22-5, 2-Methylfuran  
RL: USES (Uses)  
(electrolyte contg., for secondary lithium  
batteries)  
RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-16  
INCL 429197000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST battery lithium nonaq electrolyte solvent; furan  
methyl lithium battery electrolyte; THF methyl  
lithium battery electrolyte; EPDM rubber lithium  
battery electrolyte; ethylene carbonate lithium  
battery electrolyte  
IT Batteries, secondary  
(lithium, high-performance, with electrolytes contg.  
mixed org. solvents)  
IT Rubber, synthetic  
RL: USES (Uses)  
(EPDM, electrolyte contg., nonaq., for secondary  
lithium batteries)  
IT 7439-93-2, Lithium, uses and miscellaneous 12798-95-7  
53680-59-4  
RL: USES (Uses)  
(anodes, in batteries with electrolytes  
contg. mixed org. solvents)  
IT 1314-62-1, Vanadium pentoxide, uses and miscellaneous 1317-33-5,  
Molybdenum disulfide, uses and miscellaneous 12017-00-4, Cobalt  
dioxide 12018-01-8, Chromium dioxide 12033-29-3, Molybdenum  
trisulfide 12034-77-4, Niobium diselenide 12037-42-2, Vanadium  
oxide (V6O13) 12039-13-3, Titanium disulfide  
RL: USES (Uses)  
(cathodes, contg. EPDM rubber, in batteries with  
electrolytes contg. mixed org. solvents)  
IT 96-47-9, 2-Methyltetrahydrofuran 96-49-1, Ethylene carbonate  
534-22-5, 2-Methylfuran  
RL: USES (Uses)  
(electrolyte contg., for secondary lithium  
batteries)  
IT 74-85-1  
RL: USES (Uses)  
(rubber, EPDM, electrolyte contg., nonaq., for  
secondary lithium batteries)

L117 ANSWER 27 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1990:467305 HCAPLUS  
DOCUMENT NUMBER: 113:67305

TITLE: Performance of the low-current-density-synthesized polypyrrole in lithium cells containing propylene carbonate

AUTHOR(S): Novak, Petr; Vielstich, Wolf

CORPORATE SOURCE: Inst. Phys. Chem., Univ. Bonn, Bonn, D-5300/1, Germany

SOURCE: Journal of the Electrochemical Society (1990), 137(6), 1681-9  
CODEN: JESOAN; ISSN: 0013-4651

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The properties of polypyrrole (PPy) films synthesized at very low c.ds. (1-250  $\mu\text{A}/\text{cm}^2$ ) were investigated. Potentiodynamic cycling, FTIR spectroscopy, and differential electrochem. mass spectroscopy were employed. The use of propylene carbonate (PC) based **electrolytes** for the synthesis results in an incorporation of PC fragments (arising by the electrooxidn. of PC) into the grown polypyrrole film. During subsequent cycling of PPy films in 0.5 M  $\text{LiClO}_4/\text{PC}$  **electrolyte**, the electrochem. oxidn. of PC proceeds parallel with the doping/undoping process. The decrease in c.d. during polymer growth has the same effect as an addn. of small amts. of water into the **electrolyte** for synthesis - the performance of the polymer in **secondary** lithium **cells** is improved.

IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(**battery**, secondary, performance of low-current-d.-prepd. polypyrrole in)

RN 7439-93-2 HCAPLUS

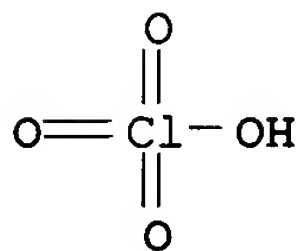
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 7791-03-9, Lithium perchlorate  
RL: PRP (Properties)  
(electrochem. polymn. of pyrrole in propylene carbonate contg.)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

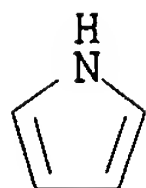


● Li

IT 109-97-7, Pyrrole  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, electrochem., on glassy carbon or gold or platinum in propylene carbonate contg. lithium perchlorate at low current densities, trace water effect on)

RN 109-97-7 HCAPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)



- CC 72-2 (Electrochemistry)  
Section cross-reference(s): 35, 36, 52
- ST polypyrrole electroprepn performance lithium **battery**;  
propylene carbonate electrooxidn pyrrole polymn; water effect  
pyrrole electropolymn
- IT **Batteries**, secondary  
(lithium-polypyrrole)
- IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(**battery**, secondary, performance of  
low-current-d.-prepd. polypyrrole in)
- IT 7791-03-9, Lithium perchlorate  
RL: PRP (Properties)  
(electrochem. polymn. of pyrrole in propylene carbonate contg.)
- IT 108-32-7, Propylene carbonate  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(oxidn. of, in electrochem. polymn. of pyrrole in propylene  
carbonate contg. lithium perchlorate, lithium secondary  
**battery** in relation to)
- IT 109-97-7, Pyrrole  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, electrochem., on glassy carbon or gold or platinum  
in propylene carbonate contg. lithium perchlorate at low current  
densities, trace water effect on)

L117 ANSWER 28 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1990:142707 HCAPLUS

DOCUMENT NUMBER: 112:142707

TITLE: Effects of organic additives on the a.c.  
impedance behavior at the lithium/  
**electrolyte** solution interface

AUTHOR(S): Morita, M.; Aoki, S.; Matsuda, Y.

CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan

SOURCE: Progress in Batteries & Solar Cells (  
1989), 8, 98-101

CODEN: PBASDR; ISSN: 0198-7259

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The effect of 2-methylfuran and 2-methylthiophene in propylene  
carbonate (I)-based **electrolytes** on the recharge capacity  
of Li anodes was investigated. The cycling efficiency of Li anodes  
in I/LiClO<sub>4</sub> was improved in presence of the additives. The a.c.  
impedance spectra of the Li anode/I-based **electrolyte**  
interface suggest that the efficiency enhancement was due to  
inhibition of film formation on the surface of the Li anode.

IT 7439-93-2, Lithium, properties

RL: PRP (Properties)  
(anodes, cycling behavior of, in propylene carbonate-based  
**electrolyte** contg. org. additives, for **batteries**  
)

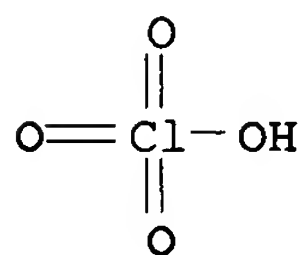
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)



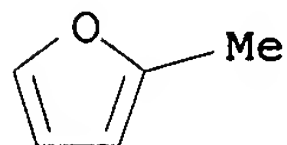
Li

IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (electrolyte contg., lithium anode cycling in, org.  
 compd. additive effect on)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

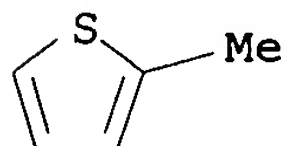


● Li

IT 534-22-5, 2-Methylfuran 554-14-3,  
 2-Methylthiophene  
 RL: USES (Uses)  
 (electrolyte contg., propylene carbonate-based, lithium  
 anode cycling in)  
 RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 76  
 ST anode lithium org electrolyte interface; methylfuran  
 electrolyte additive lithium anode; methylthiophene  
 electrolyte additive lithium anode; battery  
 lithium anode capacity  
 IT Anodes  
 (battery, lithium, cycling of, in propylene  
 carbonate-based electrolyte contg. org. compd.  
 additive)  
 IT Electric impedance  
 (interfacial, of lithium anode/propylene carbonate-based  
 electrolyte, cyclic org. compd. additive effect on)



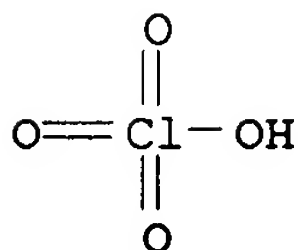
- IT 7439-93-2, Lithium, properties  
 RL: PRP (Properties)  
 (anodes, cycling behavior of, in propylene carbonate-based electrolyte contg. org. additives, for batteries)
- IT 108-32-7, Propylene carbonate 7791-03-9, Lithium perchlorate 21324-40-3, Lithium hexafluorophosphate  
 RL: USES (Uses)  
 (electrolyte contg., lithium anode cycling in, org. compd. additive effect on)
- IT 534-22-5, 2-Methylfuran 554-14-3, 2-Methylthiophene  
 RL: USES (Uses)  
 (electrolyte contg., propylene carbonate-based, lithium anode cycling in)

L117 ANSWER 29 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1989:582959 HCAPLUS  
 DOCUMENT NUMBER: 111:182959  
 TITLE: Effects of additives on the electrochemical behavior at the lithium/organic electrolyte interface  
 AUTHOR(S): Morita, Masayuki; Aoki, Seiki; Matsuda, Yoshiharu  
 CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
 SOURCE: Denki Kagaku oyobi Kogyo Butsuri Kagaku (1989), 57(6), 523-6  
 CODEN: DKOKAZ; ISSN: 0366-9297  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Japanese

AB Coulombic efficiency in the charge-discharge cycle of an Li electrode was improved by the addn. of 2-methylfuran, 2-methylthiophene, or 4-methylthiazole to the propylene carbonate/LiClO<sub>4</sub> electrolyte. The a.c. impedance at the Li/org. electrolyte interface showed that the additive is adsorbed on the Li surface to form a film which is responsible for the enhancement of coulombic efficiency.

IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (battery electrolyte contg. with propylene carbonate, electrochem. behavior of, methylfuran and methylthiophene and methylthiazole effect on)

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

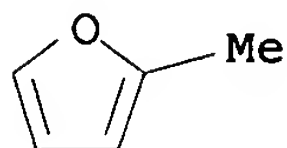


● Li

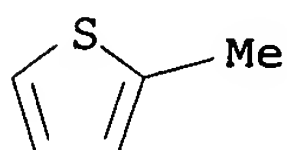
- IT 534-22-5 554-14-3, 2-Methylthiophene  
 RL: PRP (Properties)  
 (coulombic efficiency in charge-discharge cycle of lithium

electrode in presence of)

RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (electrodes, coulombic efficiency of, in charge-discharge cycle,  
 methylfuran and methylthiophene and methylthiazole effects on)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 72-2 (Electrochemistry)  
 Section cross-reference(s): 52, 66  
 ST lithium org **electrolyte** interface additive effect;  
 methylfuran effect coulombic efficiency lithium electrode;  
 methylthiophene effect coulombic efficiency lithium electrode;  
 methylthiazole effect coulombic efficiency lithium electrode  
 IT Electric impedance  
 (at interface of lithium and org. **electrolyte**,  
 adsorption of org. additives in relation to)  
 IT **Batteries**, secondary  
 (lithium, with org. **electrolyte**, effect of additives  
 on)  
 IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (battery **electrolyte** contg. with propylene  
 carbonate, electrochem. behavior of, methylfuran and  
 methylthiophene and methylthiazole effect on)  
 IT 108-32-7, Propylene carbonate  
 RL: PRP (Properties)  
 (battery **electrolyte** with, with lithium  
 perchlorate, methylfuran and methylthiophene and methylthiazole  
 effect on)  
 IT 534-22-5 554-14-3, 2-Methylthiophene 693-95-8,  
 4-Methylthiazole  
 RL: PRP (Properties)  
 (coulombic efficiency in charge-discharge cycle of lithium  
 electrode in presence of)  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (electrodes, coulombic efficiency of, in charge-discharge cycle,

methylfuran and methylthiophene and methylthiazole effects on)

L117 ANSWER 30 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1989:518141 HCAPLUS

DOCUMENT NUMBER: 111:118141

TITLE: Behavior of the lithium electrode during cycling  
in nonaqueous solutions

AUTHOR(S): Geronov, Yu.; Zlatilova, P.; Puresheva, B.;  
Pasquali, M.; Pistoia, G.

CORPORATE SOURCE: Cent. Lab. Electrochem. Power Sources, Sofia,  
1040, Bulg.

SOURCE: Journal of Power Sources (1989),  
26(3-4), 585-91  
CODEN: JPSODZ; ISSN: 0378-7753

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The highest efficiency of Li anode-limited **batteries** at a  
c.d. of 4 mA/cm<sup>2</sup> and a charge d. of 2 mA-h/cm<sup>2</sup> was obtained when  
LiAsF<sub>6</sub> in THF/2-methyltetrahydrofuran contg. 2 vol.% 2-methylfuran  
was used as **electrolyte**. Neither the cell type (glass or  
metal) nor the kind of cathode material (LiV<sub>3</sub>O<sub>8</sub> or LiCr<sub>0.9</sub>V<sub>0.1</sub>S<sub>2</sub>)  
had any substantial effect on the efficiency. The changes of  
polarization resistance, ohmic drop in the soln., and geometric  
capacitance with cycling were investigated by a galvanostatic pulse  
method. The method was used successfully to study the passivation  
of the Li anode during cycling in the ether mixt.  
**electrolyte**.

IT 7439-93-2, Lithium, properties

RL: PRP (Properties)

(anodes, behavior of, in cycling of **battery** with ether  
mixt. **electrolyte**)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

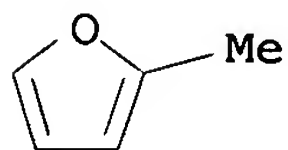
IT 534-22-5, 2-Methylfuran

RL: USES (Uses)

(**electrolyte** contg., lithium anode behavior in, in  
cycling of **battery**)

RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



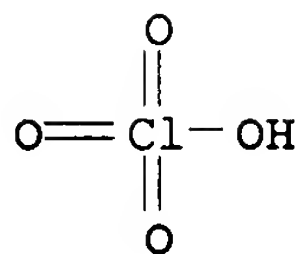
IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)

(**electrolyte**, in propylene carbonate-ether mixt.,  
lithium anode behavior in, in cycling of **battery**)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72
- ST lithium **battery** anode cycling behavior; ether mixt  
**electrolyte** lithium **battery**; passivation lithium  
anode nonaq **battery**
- IT **Electrolytic** polarization  
(anodic-cathodic, of lithium, in cycling of **battery**  
with ether mixt. **electrolyte**)
- IT Anodes  
(**battery**, lithium, cycling behavior of, in ether mixt.  
**electrolyte**)
- IT Passivation  
(electrochem., of lithium anodes, in cycling of **battery**  
with ether mixt. **electrolyte**)
- IT 7439-93-2, Lithium, properties  
RL: PRP (Properties)  
(anodes, behavior of, in cycling of **battery** with ether  
mixt. **electrolyte**)
- IT 96-47-9, 2-Methyltetrahydrofuran 96-49-1, Ethylene carbonate  
108-32-7, Propylene carbonate 109-99-9, Thf, properties  
110-71-4, Dimethoxyethane 534-22-5, 2-Methylfuran  
RL: USES (Uses)  
(**electrolyte** contg., lithium anode behavior in, in  
cycling of **battery**)
- IT 29935-35-1, Lithium hexafluoroarsenate  
RL: USES (Uses)  
(**electrolyte**, in ether mixt., lithium anode behavior  
in, in **battery** cycling)
- IT 7791-03-9, Lithium perchlorate  
RL: USES (Uses)  
(**electrolyte**, in propylene carbonate-ether mixt.,  
lithium anode behavior in, in cycling of **battery**)

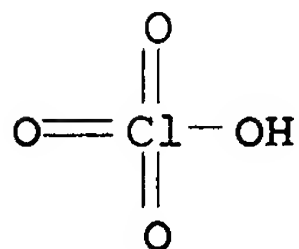
L117 ANSWER 31 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1989:518140 HCAPLUS  
DOCUMENT NUMBER: 111:118140  
TITLE: Organic additives for the **electrolytes**  
of rechargeable lithium **batteries**  
AUTHOR(S): Matsuda, Yoshiharu; Morita, Masayuki  
CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
SOURCE: Journal of Power Sources (1989),  
26(3-4), 579-83  
CODEN: JPSODZ; ISSN: 0378-7753  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB The effects of some org. additives contg. hetero-atoms  
[2-methylfuran (I), thiophene (II), 2-methylthiophene,  
2,5-dimethylthiophene, pyrrole (III), and 4-methylthiazole] in amts.

0.2-1.0 vol.%, on the charge-discharge characteristics of Li anodes were investigated in propylene carbonate (IV)- or DMSO-based **electrolytes**. The addn. of II to IV-based **electrolytes** improved the coulombic efficiency of the cycle, and the addn. of III was effective for cycling in LiPF<sub>6</sub>/DMSO. The effect of the addn. of I was significant in the solns. contg. LiPF<sub>6</sub>. The coulombic efficiency of the Li anode was detd. by a galvanostatic charge/discharge cycle on a Ni substrate. Based on a.c. impedance behavior of the electrode/**electrolyte** interface, the additive effects are related to changes in the interface structure.

IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, charge-discharge behavior of, in **electrolytes**  
 contg. heterocyclic compd., for **batteries**)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

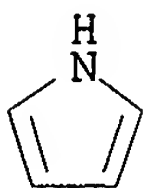
Li

IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (**electrolytes**, in org. solvents, lithium  
**battery** anode performance in, heterocyclic compd.  
 additive effect on)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



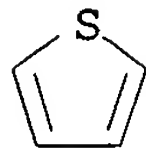
● Li

IT 109-97-7, Pyrrole 110-02-1, Thiophene  
 534-22-5, 2-Methylfuran 554-14-3,  
 2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
 RL: USES (Uses)  
 (lithium perchlorate-propylene carbonate **electrolyte**  
 contg., charge-discharge behavior of lithium anodes in, for  
 secondary **batteries**)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



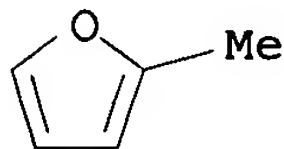
RN 110-02-1 HCAPLUS

CN Thiophene (8CI, 9CI) (CA INDEX NAME)



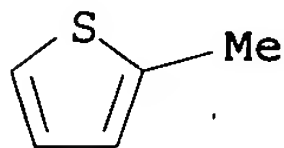
RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



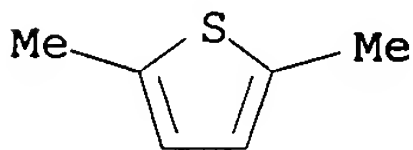
RN 554-14-3 HCAPLUS

CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 638-02-8 HCAPLUS

CN Thiophene, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72, 76

ST lithium **battery electrolyte** heterocyclic compd;

anode lithium **battery efficiency electrolyte**

IT **Batteries**, secondary

(lithium, heterocyclic compd.-contg. **electrolytes** for)

IT Electric impedance

(of lithium electrode in lithium perchlorate-propylene carbonate

**electrolyte**, thiophene additive effect on)

IT Anodes

(**battery**, lithium, charge-discharge behavior of, in

**electrolytes** contg. heterocyclic compd.)

IT 7439-93-2, Lithium, uses and miscellaneous

RL: USES (Uses)

(anodes, charge-discharge behavior of, in **electrolytes**

contg. heterocyclic compd., for **batteries**)

IT 67-68-5, DmsO, uses and miscellaneous 108-32-7, Propylene carbonate

RL: USES (Uses)

(**electrolytes** contg., lithium anode performance in,

heterocyclic compd. additive effect on, for rechargeable **batteries**)

IT 7791-03-9, Lithium perchlorate 21324-40-3, Lithium hexafluorophosphate

RL: USES (Uses)

(electrolytes, in org. solvents, lithium  
battery anode performance in, heterocyclic compd.  
additive effect on)

IT 109-97-7, Pyrrole 110-02-1, Thiophene  
534-22-5, 2-Methylfuran 554-14-3,  
2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
693-95-8, 4-Methylthiazole  
RL: USES (Uses)  
(lithium perchlorate-propylene carbonate electrolyte  
contg., charge-discharge behavior of lithium anodes in, for  
secondary batteries)

L117 ANSWER 32 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1989:118256 HCAPLUS  
DOCUMENT NUMBER: 110:118256  
TITLE: Behavior of some additives on secondary lithium  
electrode in organic electrolyte  
AUTHOR(S): Matsuda, Y.; Morita, M.  
CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, Japan  
SOURCE: Battery Material Symposium, [Proceedings] (  
1987), 3, 153-4  
CODEN: BMSPEW  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB The addn. of crown ethers into the electrolyte soln. of  
rechargeable Li batteries scarcely affected the  
charge-discharge cycling efficiency of the Li anode. The addn. of  
aliph. ethers into the electrolyte did not improve the  
coulombic efficiency in charge-discharge cycling of Li anodes,  
except in the case of propylene carbonate (I)-LiPF<sub>6</sub> system contg.  
di- or triethylene glycol Me ether. The charge-discharge efficiency  
was improved by the addn. of thiophene into I-LiClO<sub>4</sub>, I-LiPF<sub>6</sub>, or  
I-THF/LiPF<sub>6</sub>; 2-methylfuran into I-LiPF<sub>6</sub>, I-THF-LiPF<sub>6</sub>, or DMSO-LiPF<sub>6</sub>;  
pyrrole into I-THF/LiPF<sub>6</sub> or DMSO/LiPF<sub>6</sub>; and 4-methylthiazole into  
I-LiPF<sub>6</sub>.

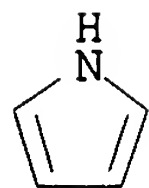
IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(anodes, performance of, in org. electrolytes contg.  
crown ether and aliph. polyether and unsatd. cyclic compd.  
additives, for secondary battery)

RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

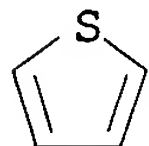
Li

IT 109-97-7, Pyrrole 110-02-1, Thiophene  
534-22-5, 2-Methylfuran 554-14-3,  
2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
RL: USES (Uses)  
(electrolyte contg., secondary lithium battery  
performance in relation to)

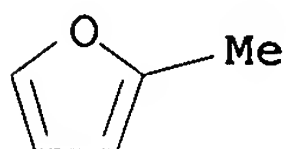
RN 109-97-7 HCAPLUS  
CN 1H-Pyrrole (9CI) (CA INDEX NAME)



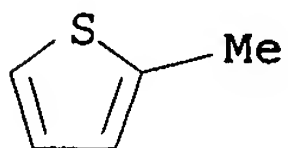
RN 110-02-1 HCAPLUS  
CN Thiophene (8CI, 9CI) (CA INDEX NAME)



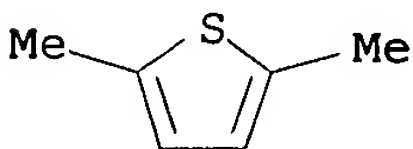
RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS  
CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)

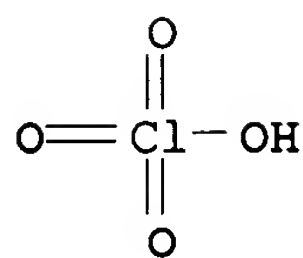


RN 638-02-8 HCAPLUS  
CN Thiophene, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate  
RL: USES (Uses)  
(electrolytes, in org. solvents, contg. crown ether and  
aliph. polyether and unsatd. cyclic compd., secondary lithium  
battery performance in relation to)  
RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)





## ● Li

- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST lithium **battery** performance **electrolyte**  
additive; crown ether additive lithium **battery**; polyether  
additive **electrolyte** lithium **battery**; cyclic  
compd additive lithium **battery**
- IT **Batteries**, secondary  
(lithium, with org. **electrolytes**, performance of, crown  
ether and aliph. polyether and unsatd. cyclic compd. effect on)
- IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(anodes, performance of, in org. **electrolytes** contg.  
crown ether and aliph. polyether and unsatd. cyclic compd.  
additives, for secondary **battery**)
- IT 109-86-4, 2-Methoxyethanol 109-97-7, Pyrrole  
110-02-1, Thiophene 111-77-3, Diethylene glycol monomethyl  
ether 112-35-6, Triethylene glycol monomethyl ether 294-93-9,  
12-Crown-4 534-22-5, 2-Methylfuran 554-14-3,  
2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
693-95-8, 4-Methylthiazole 33100-27-5, 15-Crown-5  
RL: USES (Uses)  
(**electrolyte** contg., secondary lithium **battery**  
performance in relation to)
- IT 109-99-9, Thf, uses and miscellaneous 110-71-4,  
1,2-Dimethoxyethane 629-14-1, 1,2-Diethoxyethane 5137-45-1,  
1-Ethoxy-2-methoxyethane  
RL: USES (Uses)  
(**electrolyte** solvent contg., lithium secondary  
**battery** with, additive effect on)
- IT 67-68-5, DmsO, uses and miscellaneous 108-32-7, Propylene  
carbonate  
RL: USES (Uses)  
(**electrolyte** solvent, lithium secondary **battery**  
with, additive effect on)
- IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium  
tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
RL: USES (Uses)  
(**electrolytes**, in org. solvents, contg. crown ether and  
aliph. polyether and unsatd. cyclic compd., secondary lithium  
**battery** performance in relation to)

L117 ANSWER 33 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1989:79266 HCAPLUS  
DOCUMENT NUMBER: 110:79266  
TITLE: Behavior of some additives on secondary lithium  
electrode in organic **electrolytes**  
AUTHOR(S): Matsuda, Y.; Morita, M.  
CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
SOURCE: Progress in Batteries & Solar Cells (

1988), 7, 266-70

CODEN: PBASDR; ISSN: 0198-7259

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The effect of org. additives to propylene carbonate (I)-based **electrolytes** for secondary Li **batteries** was evaluated in terms of improved cycling efficiency (CE) of the Li anodes. Some aliph. polyethers (THF, 1,2-dimethoxyethane, 1-ethoxy-2-methoxyethane, 1,2-diethoxyethane) added to I, promoted a decrease in the polarization of the Li anode and improved CE, but other aliph. ethers did not. Crown ethers added to the **electrolyte** affected the CE of Li anodes, but the CE of TiS<sub>2</sub> cathodes improved in **electrolytes** contg. crown ethers. The interactions between the additive and **electrolyte**, esp. the counterion had a strong effect on the Li anode, esp. regarding the double layer structure based on species adsorbed on the Li surface. 31245 45123.

IT 7439-93-2, Lithium, uses and miscellaneous

RL: USES (Uses)

(anodes, cycling efficiency of, in propylene carbonate-lithium salt **electrolytes**, org. additive effect on)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 109-97-7, Pyrrole 110-02-1, Thiophene

534-22-5, 2-Methylfuran 554-14-3,

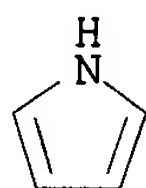
2-Methylthiophene 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)

RL: USES (Uses)

(**electrolytes** contg. **lithium salt** and propylene carbonate and, lithium anode cycling efficiency in)

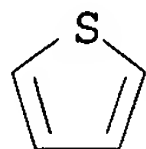
RN 109-97-7 HCAPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)



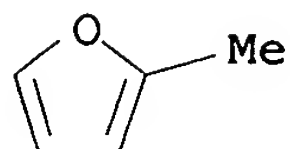
RN 110-02-1 HCAPLUS

CN Thiophene (8CI, 9CI) (CA INDEX NAME)

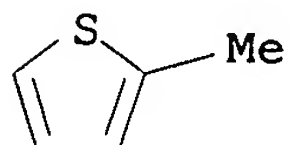


RN 534-22-5 HCAPLUS

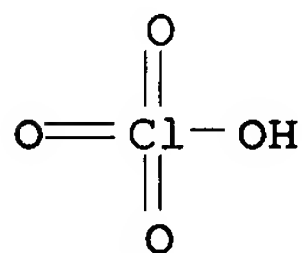
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

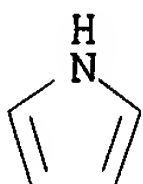
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72  
 ST propylene carbonate **electrolyte** org additive; lithium  
**battery** propylene carbonate **electrolyte**; anode  
 lithium org additive **electrolyte**; ether crown  
**electrolyte** lithium anode; titanium sulfide cathode org  
**electrolyte**  
 IT **Batteries**, secondary  
 (lithium, propylene carbonate-lithium salt  
**electrolytes** for, org. additive effect on)  
 IT Anodes  
 (**battery**, lithium, cycling efficiency of, in propylene  
 carbonate-lithium salt **electrolyte**,  
 org. additive effect on)  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, cycling efficiency of, in propylene carbonate-  
 lithium salt **electrolytes**, org.  
 additive effect on)  
 IT 109-86-4, 2-Methoxyethanol 109-97-7, Pyrrole 109-99-9,  
 THF, uses and miscellaneous 110-02-1, Thiophene  
 110-71-4, 1,2-Dimethoxyethane 111-77-3, Diethylene glycol  
 monomethyl ether 112-35-6, Triethylene glycol monomethyl ether  
 294-93-9, 12-Crown-4 534-22-5, 2-Methylfuran  
 554-14-3, 2-Methylthiophene 629-14-1, 1,2-Diethoxyethane  
 693-95-8, 4-Methylthiazole 5137-45-1, 1-Ethoxy-2-methoxyethane  
 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>) 33100-27-5,  
 15-Crown-5  
 RL: USES (Uses)  
 (**electrolytes** contg. lithium salt

and propylene carbonate and, lithium anode cycling efficiency in)  
IT 108-32-7, Propylene carbonate  
RL: USES (Uses)  
(electrolytes contg. lithium salt  
and, org. additives for, lithium anode cycling efficiency in)  
IT 14283-07-9, Lithium tetrafluoroborate (LiBF<sub>4</sub>) 29935-35-1, Lithium  
hexafluoroarsenate  
RL: USES (Uses)  
(electrolytes contg. propylene carbonate and org.  
additive and, lithium anode cycling efficiency in)

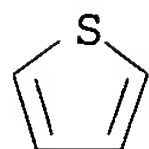
L117 ANSWER 34 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1988:207665 HCAPLUS  
DOCUMENT NUMBER: 108:207665  
TITLE: Addition effects of some organic compounds on  
the cycling behavior of lithium electrode  
AUTHOR(S): Matsuda, Y.; Hayashida, H.; Morita, M.  
CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
SOURCE: Proceedings - Electrochemical Society (  
1988), 88-6 (Proc. Symp. Primary Second.  
Ambient Temp. Lithium Batteries, 1987), 610-17  
CODEN: PESODO; ISSN: 0161-6374  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB The cycling efficiency (CE) of Li anodes was improved by addn. of  
org. compds. such as thiophene to propylene carbonate-based  
electrolytes. Addn. of pyrrole to DMSO/LiPF<sub>6</sub> also improves  
the Li anode CE. The additives induce changes in the structure of  
the electrode-electrolyte interface involving the  
electrode double layer and surface film.  
IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(anodes, improved cycling efficiency of, thiophene and pyrrole  
electrolyte additives for)  
RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

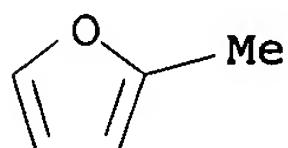
IT 109-97-7, Pyrrole 110-02-1, Thiophene  
534-22-5, 2-Methylfuran 554-14-3,  
2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
RL: USES (Uses)  
(electrolytes contg., lithium anode cycle efficiency  
improvement by)  
RN 109-97-7 HCAPLUS  
CN 1H-Pyrrole (9CI) (CA INDEX NAME)



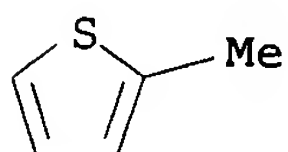
RN 110-02-1 HCAPLUS  
CN Thiophene (8CI, 9CI) (CA INDEX NAME)



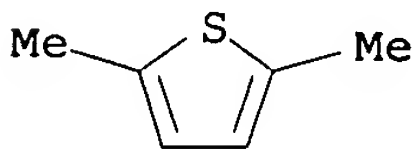
RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



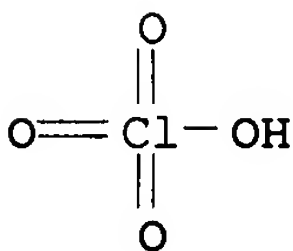
RN 554-14-3 HCAPLUS  
CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 638-02-8 HCAPLUS  
CN Thiophene, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate (LiClO4)  
RL: USES (Uses)  
(electrolytes contg., thiophene additive in, lithium  
anode cycle efficiency in relation to)  
RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72  
ST lithium anode cycling life additive; thiophene **electrolyte**  
lithium anode cycling; pyrrole **electrolyte** lithium anode  
cycling; **battery** lithium anode cycling life  
IT Electric impedance  
(of lithium anodes, in DMSO-lithium hexafluorophosphate  
**electrolytes**, additive effect on)

IT Anodes  
(battery, lithium, improved cycling efficiency of,  
thiophene and pyrrole electrolyte additives for)

IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(anodes, improved cycling efficiency of, thiophene and pyrrole  
electrolyte additives for)

IT 67-68-5, DMSO, uses and miscellaneous 2537-36-2,  
Tetramethylammonium perchlorate 21324-40-3, Lithium  
hexafluorophosphate (LiPF6)  
RL: USES (Uses)  
(electrolytes contg., additives for, lithium anode  
cycling efficiency in relation to)

IT 109-97-7, Pyrrole 109-99-9, THF, uses and miscellaneous  
110-02-1, Thiophene 110-71-4 534-22-5,  
2-Methylfuran 554-14-3, 2-Methylthiophene 638-02-8  
, 2,5-Dimethylthiophene 693-95-8, 4-Methylthiazole  
RL: USES (Uses)  
(electrolytes contg., lithium anode cycle efficiency  
improvement by)

IT 108-32-7, Propylene carbonate 7791-03-9, Lithium  
perchlorate (LiClO4)  
RL: USES (Uses)  
(electrolytes contg., thiophene additive in, lithium  
anode cycle efficiency in relation to)

L117 ANSWER 35 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1988:64511 HCAPLUS

DOCUMENT NUMBER: 108:64511

TITLE: Oxidation potentials of electrolyte  
solutions for lithium cells

AUTHOR(S): Ossola, F.; Pistoia, G.; Seeber, R.; Ugo, P.

CORPORATE SOURCE: Ist. Chim. Tecnol. Radioelem., C. N. R., Padova,  
Italy

SOURCE: Electrochimica Acta (1988), 33(1),  
47-50

CODEN: ELCAAV; ISSN: 0013-4686

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The oxidn. potentials, Eox of several solns. of interest for nonaq.  
Li cells were measured by linear sweep voltammetric expts. A  
correlation is found between Eox and the basicity of the solvents,  
expressed by their donor nos. (DN). Esters and sulfones have higher  
resistance to oxidn. than ethers, which possess the highest DN  
values. All solns. had Eox > 4 V vs. Li/Li+. However, some  
reactivity between pos. electrodes and solns. was obsd. below this  
potential.

IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)

(batteries, primary, oxidn. potential of  
electrolyte solns. for)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 12423-04-0  
RL: PRP (Properties)

(electrodes, in lithium cells, oxidn. potential of  
electrolyte solns. in relation to)

RN 12423-04-0 HCAPLUS

CN Lithium vanadium oxide (LiV3O8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	8	17778-80-2
V	3	7440-62-2
Li	1	7439-93-2

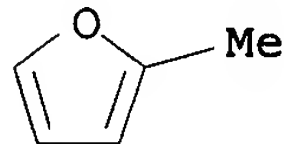
IT 534-22-5, 2-Methylfuran

RL: PRP (Properties)

(oxidn. potential of electrolyte solns. of  
methylnetetrahydrofuran and THF and, in lithium cells)

RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



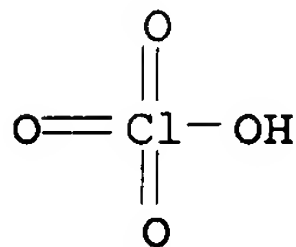
IT 7791-03-9, Lithium perchlorate

RL: PRP (Properties)

(oxidn. potentials of electrolyte solns. for lithium  
cells contg.)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 72-2 (Electrochemistry)

Section cross-reference(s): 23, 27, 52, 78

ST lithium cell electrolyte oxidn potential

IT Batteries, primary

(lithium, oxidn. of electrolyte solns. in)

IT Cathodes

(teflonized acetylene black, in lithium batteries)

IT Electric potential

(oxidn., of electrolyte solns., basicity of solvents  
effect on)

IT 7439-93-2, Lithium, uses and miscellaneous

RL: USES (Uses)

(batteries, primary, oxidn. potential of  
electrolyte solns. for)

IT 7440-44-0, Carbon, uses and miscellaneous

RL: USES (Uses)

- (electrode from glassy, in lithium cell, oxidn. potential of electrolyte solns. in relation to)
- IT 7440-06-4, Platinum, uses and miscellaneous  
RL: USES (Uses)  
(electrode, in lithium cells, oxidn. potentials of electrolyte solns. in relation to)
- IT 12423-04-0  
RL: PRP (Properties)  
(electrodes, in lithium cells, oxidn. potential of electrolyte solns. in relation to)
- IT 96-47-9, 2-Methyltetrahydrofuran  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of THF and, in lithium cells)
- IT 126-33-0, Sulfolane  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of benzene and, in lithium cells)
- IT 108-32-7, Propylene carbonate  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of dimethoxyethane and, in lithium cells)
- IT 534-22-5, 2-Methylfuran  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of methyltetrahydrofuran and THF and, in lithium cells)
- IT 109-99-9, properties  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of methyltetrahydrofuran and, in lithium cells)
- IT 71-43-2, Benzene, properties  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of sulfolane and, in lithium cells)
- IT 107-31-3, Methylformate  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of, in lithium cells)
- IT 110-71-4, Dimethoxyethane  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of, in presence and in absence of propylene carbonate, in lithium cells)
- IT 7791-03-9, Lithium perchlorate 29935-35-1  
RL: PRP (Properties)  
(oxidn. potentials of electrolyte solns. for lithium cells contg.)

L117 ANSWER 36 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1987:543533 HCAPLUS

DOCUMENT NUMBER: 107:143533

TITLE: Characteristics of electrochemically synthesized polymer electrodes in lithium cells - III.  
Polypyrrole

AUTHOR(S): Panero, S.; Prosperi, P.; Bonino, F.; Scrosati, B.; Corradini, A.; Mastragostino, M.

CORPORATE SOURCE: Dip. Chim., Univ. Roma "La Sapienza", Rome, Italy

SOURCE: Electrochimica Acta (1987), 32(7), 1007-11

CODEN: ELCAAV; ISSN: 0013-4686



DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB The characteristics of electrochem. synthesized polypyrrole electrodes were examd. in the LiClO<sub>4</sub>-propylene carbonate electrolyte, by cyclic voltammetry, charge-discharge cycling, frequency response anal. and by visible-near IR absorption spectra. These polymer electrodes behave satisfactorily in terms of kinetics of the electrochem. doping process, cyclability and charge-discharge efficiency. Their performance under high rates may be limited by the diffusion of the perchlorate counterion. Polypyrrole was more stable than other conducting polymers in org. electrolytes of interest for the development of rechargeable Li batteries.

IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (battery, secondary, with polypyrrole)

RN 7439-93-2 HCAPLUS

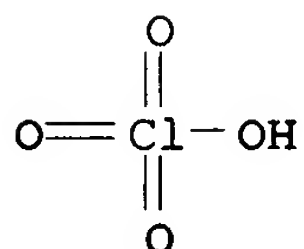
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (electrochem. redox reaction of perchlorate-doped polypyrrole in propylene carbonate contg., doping-undoping in relation to)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

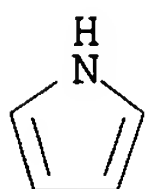


● Li

IT 109-97-7, Pyrrole  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymn. of, electrochem., on platinum in acetonitrile contg. lithium perchlorate)

RN 109-97-7 HCAPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)

Section cross-reference(s): 35, 36, 52

ST polypyrrole electrogenerated electrode; battery lithium polypyrrole; redox electrochem perchlorate doped polypyrrole;

conducting polymer polypyrrole electrodeposition  
IT **Batteries**, secondary  
(lithium-polypyrrole, with propylene carbonate contg. lithium perchlorate)  
IT Cathodes  
(**battery**, polypyrrole)  
IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(**battery**, secondary, with polypyrrole)  
IT 7791-03-9, Lithium perchlorate  
RL: PRP (Properties)  
(electrochem. redox reaction of perchlorate-doped polypyrrole in propylene carbonate contg., doping-undoping in relation to)  
IT 109-97-7, Pyrrole  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, electrochem., on platinum in acetonitrile contg. lithium perchlorate)

=> d 1123 ibib abs hitstr hitind 1-5

L123 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:689399 HCAPLUS

DOCUMENT NUMBER: 145:127638

TITLE: Nonaqueous electrolyte solution for lithium secondary **batteries**

INVENTOR(S): Ahn, Sun Ho; Cho, Jeong Ju; Kim, Hyeong Jin; Lee, Han Ho; Lee, Ho Chun; Lee, Jae Heon; Son, Mi Yeong

PATENT ASSIGNEE(S): Lg Chem. Ltd., S. Korea

SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp. given  
CODEN: KRXXA7

DOCUMENT TYPE: Patent

LANGUAGE: Korean

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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KR 2004023870	A	20040320	KR 2002-55309	20020912
				20020912

PRIORITY APPLN. INFO.: KR 2002-55309

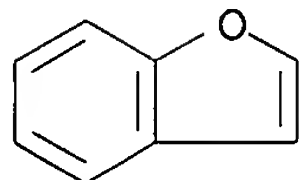
AB In this Li **battery** with a nonaq. electrolyte soln. overcharge current is blocked through polymn. of electrolyte components by degrdn. due to oxidn., thereby improving safety. The nonaq. electrolyte soln. comprises a Li salt, an electrolyte soln. compd., 0.5-5% of a nonconductive polymer monomer, and 0.1-2% of a conductive polymer monomer. Preferably the nonconductive polymer monomer is cyclohexylbenzene, isopropylbenzene or 5-butylbenzene; and the conductive polymer monomer is biphenyl, 1-phenyl-1-cyclohexane or benzofuran. The Li secondary **battery** comprises a cathode, an anode, a porous separator, and the nonaq. electrolyte soln.

IT 271-89-6, Benzofuran  
RL: DEV (Device component use); USES (Uses)

(electrolyte contg.; nonaq. electrolyte soln. for lithium  
secondary **batteries** with safety feature)

RN 271-89-6 HCAPLUS

CN Benzofuran (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium secondary **battery** nonaq electrolyte safety

IT Secondary **batteries**

(lithium; nonaq. electrolyte soln. for lithium secondary  
**batteries** with safety feature)

IT **Battery** electrolytes  
Safety

(nonaq. electrolyte soln. for lithium secondary **batteries**  
with safety feature)

IT 92-52-4, Biphenyl, uses 98-82-8, Isopropylbenzene 135-98-8  
271-89-6, Benzofuran 827-52-1

RL: DEV (Device component use); USES (Uses)

(electrolyte contg.; nonaq. electrolyte soln. for lithium  
secondary **batteries** with safety feature)

L123 ANSWER 2 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1005599 HCAPLUS

DOCUMENT NUMBER: 143:289485

TITLE: Secondary **battery**

INVENTOR(S): Ishii, Hariyoshi; Saruwatari, Hidesato; Hirai,  
Takahiro; Takami, Norio

PATENT ASSIGNEE(S): Toshiba Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 16 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005251683	A2	20050915	JP 2004-64083	20040308

PRIORITY APPLN. INFO.: JP 2004-64083

20040308

AB The **battery** has a cathode; an anode, contg.  $\geq 1$   
anode active mass selected from Al, Al alloys, Mg, and Mg alloys;  
and an electrolyte soln., contg. an org. compd. which has a  
porphyrin structured base-backbone, its deriv., and/or an ion of the  
org. compd.

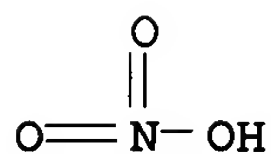
IT 7790-69-4, Lithium nitrate 10377-48-7, Lithium  
sulfate

RL: DEV (Device component use); USES (Uses)

(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)

RN 7790-69-4 HCAPLUS

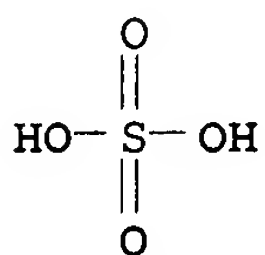
CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 10377-48-7 HCAPLUS

CN Sulfuric acid, dilithium salt (8CI, 9CI) (CA INDEX NAME)



●2 Li

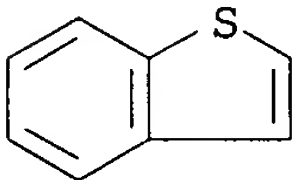
IT 95-15-8, Thio naphthene

RL: MOA (Modifier or additive use); USES (Uses)

(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)

RN 95-15-8 HCAPLUS

CN Benzo[b]thiophene (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-06

ICS H01M004-06; H01M004-46

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary **battery** anode aluminum magnesium alloy;

**battery** electrolyte porphyrin compd

IT **Battery** anodes

**Battery** electrolytes

Secondary **batteries**

(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)

IT 96-48-0, γ-Butyrolactone 623-53-0, Methyl ethyl carbonate

1313-13-9, Manganese dioxide, uses 7429-90-5, Aluminum, uses

7446-70-0, Aluminum chloride, uses 7447-41-8, Lithium chloride,

uses 7631-99-4, Sodium nitrate, uses 7664-93-9, Sulfuric acid,  
uses 7757-79-1, Potassium nitrate, uses 7783-20-2, Ammonium  
sulfate, uses 7786-30-3, Magnesium chloride, uses  
7790-69-4, Lithium nitrate 10377-48-7, Lithium  
sulfate 10377-60-3, Magnesium nitrate 11109-06-1 12125-02-9,  
Ammonium chloride, uses 12780-46-0 37326-54-8 57921-51-4  
125196-14-7 278798-61-1

RL: DEV (Device component use); USES (Uses)

(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)

IT 67-03-8, Thiamin hydrochloride 95-15-8, Thio naphthene  
109-99-9, THF, uses 110-02-1, Thiophene 288-47-1, Thiazole  
289-72-5, Thiopyran 574-93-6, Phthalocyanine 4396-11-6,  
Porphyrinogen 35218-75-8D, derivs. 51094-17-8D, derivs.  
60475-00-5, Thiopyran

RL: MOA (Modifier or additive use); USES (Uses)

(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)

L123 ANSWER 3 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:633136 HCAPLUS

DOCUMENT NUMBER: 139:152388

TITLE: Nonaqueous electrolyte compositions for lithium  
secondary **batteries**

INVENTOR(S): Song, Eui-hwan; Jung, Won-il; Hwang, Duck-chul

PATENT ASSIGNEE(S): S. Korea

SOURCE: U.S. Pat. Appl. Publ., 5 pp., Cont.-in-part of  
U.S. Ser. No. 565,158, abandoned.  
CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2003152840	A1	20030814	US 2002-278354	200210 22
PRIORITY APPLN. INFO.:			US 2000-565158	B2 200005 03

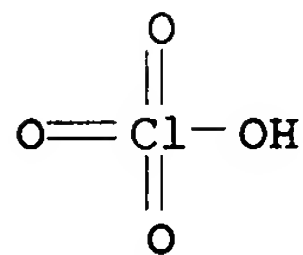
AB Disclosed are nonaq. electrolyte compns. of the present invention  
that comprise nonaq. solvents and monomers such as aniline,  
phenanthrene, ethylenedioxythiophene, benzothiophene or derivs.  
thereof. The monomers are contained in the electrolytes of the  
present invention in the amts. of less than about 5.0 wt.% of the  
nonaq. solvent. In the present invention, cyclic carbonates, linear  
carbonates or mixts. thereof can be used as the nonaq. solvents.  
The electrolyte compns. of the present invention improve the safety  
characteristics of the cell by preventing the flow of large currents  
resulting from overcharge or feed-through, and also improve cell  
life characteristic by helping the reversible transfer of lithium  
ions.

IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium  
triflate

RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte compns. for lithium secondary  
**batteries**)

RN 7791-03-9 HCAPLUS

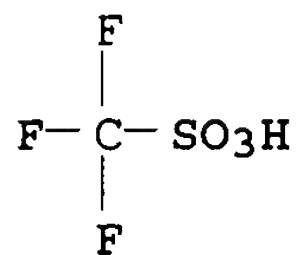
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



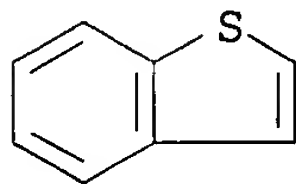
● Li

IT 95-15-8, Benzothiophene

RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte compns. for lithium secondary  
**batteries**)

RN 95-15-8 HCAPLUS

CN Benzo[b]thiophene (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40

ICS H01M004-60; H01M004-58

INCL 429338000; 429342000; 429213000; 429231400

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

ST nonaq electrolyte compn lithium secondary **battery**; safety  
 nonaq electrolyte compn lithium secondary **battery**

IT Carbonaceous materials (technological products)

RL: MOA (Modifier or additive use); SPN (Synthetic preparation);  
 PREP (Preparation); USES (Uses)

(graphitized; nonaq. electrolyte compns. for lithium secondary  
**batteries**)

IT Secondary **batteries**  
 (lithium; nonaq. electrolyte compns. for lithium secondary  
**batteries**)

IT Pitch fibers  
 (mesophase; nonaq. electrolyte compns. for lithium secondary  
**batteries**)

IT **Battery** electrolytes  
 Carbonization  
 Conducting polymers  
 Graphitization  
 (nonaq. electrolyte compns. for lithium secondary  
**batteries**)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 623-53-0, Ethyl methyl carbonate 7791-03-9, Lithium  
 perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3,  
 Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 210353-06-3, Cobalt lithium  
 nickel strontium oxide  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte compns. for lithium secondary  
**batteries**)

IT 85-01-8, Phenanthrene, uses 95-15-8, Benzothiophene  
 126213-51-2, Poly(Ethylenedioxythiophene)  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte compns. for lithium secondary  
**batteries**)

L123 ANSWER 4 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:46267 HCAPLUS

DOCUMENT NUMBER: 134:118341

TITLE: Secondary nonaqueous **electrolyte**  
**batteries** using improved anodes and  
**electrolytes**, and manufacture of the  
**batteries**

INVENTOR(S): Maekawa, Yukio

PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

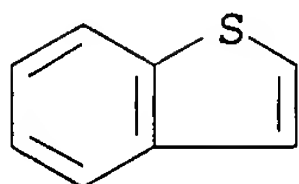
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2001015172	A2	20010119	JP 1999-240599	199908 26
PRIORITY APPLN. INFO.:			JP 1999-118296	A 199904 26

AB Secondary nonaq. **electrolyte batteries** have  
 cathode sheets contg. Li-contg. mixed rare earth oxides as active  
 materials, anode sheets contg. Li-intercalatable C materials and  
 having auxiliary layers bonded to Li-based metal foils, and nonaq.  
**electrolytes** contg. Li salts and  
 additives selected from hydrazines and arom. compds. The  
**battery** components are assembled and aged for permeation of

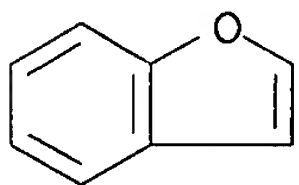


Li into the anodes to give the secondary **batteries**. The **batteries** have high capacity.

IT 95-15-8, Benzothiophene 271-89-6, Benzofuran  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (electrolyte solns. contg.; secondary nonaq. electrolyte **batteries** using anodes bonded to Li-contg. foils and electrolytes contg. hydrazines and/or arom. compds.)  
 RN 95-15-8 HCAPLUS  
 CN Benzo[b]thiophene (8CI, 9CI) (CA INDEX NAME)



RN 271-89-6 HCAPLUS  
 CN Benzofuran (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); USES (Uses)  
 (foil; secondary nonaq. electrolyte **batteries** using anodes bonded to Li-contg. foils and electrolytes contg. hydrazines and/or arom. compds.)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IC ICM H01M010-40  
 ICS H01M010-40; H01M004-02; H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte **battery** anode carbon lithium; hydrazine nonaq electrolyte lithium **battery**; arom compd nonaq electrolyte lithium **battery**  
 IT Carbonaceous materials (technological products)  
 RL: DEV (Device component use); USES (Uses)  
 (anodes; secondary nonaq. electrolyte **batteries** using anodes bonded to Li-contg. foils and electrolytes contg. hydrazines and/or arom. compds.)  
 IT Heterocyclic compounds  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (arom.; secondary nonaq. electrolyte **batteries** using anodes bonded to Li-contg. foils and electrolytes contg. hydrazines and/or arom. compds.)  
 IT Aromatic compounds  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES



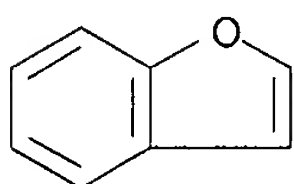
- (Uses)  
(heterocyclic; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT Secondary **batteries**  
(lithium; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT Carbon fibers, uses  
RL: DEV (Device component use); USES (Uses)  
(mesophase pitch-based, anodes; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT **Battery anodes**  
**Battery cathodes**  
**Battery electrolytes**  
(secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses  
RL: DEV (Device component use); USES (Uses)  
(anodes; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT 12190-79-3, Cobalt lithium oxide (colio2)  
RL: DEV (Device component use); USES (Uses)  
(cathodes; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT 95-15-8, Benzothiophene 260-94-6, Acridine  
271-89-6, Benzofuran 2171-74-6, Catechol cyclic carbonate  
15429-36-4  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(**electrolyte** solns. contg.; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
108-32-7, Propylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** solns.; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte**; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)
- IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); USES (Uses)  
(foil; secondary nonaq. **electrolyte batteries** using anodes bonded to Li-contg. foils and **electrolytes** contg. hydrazines and/or arom. compds.)

DOCUMENT NUMBER: 132:154449  
 TITLE: Secondary nonaqueous electrolyte  
**batteries**  
 INVENTOR(S): Takahashi, Masatoshi; Yasutake, Zensaku; Abe,  
 Hiroshi; Ueki, Akira; Takai, Tsutomu  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan; Ube Industries,  
 Ltd.  
 SOURCE: Jpn. Kokai Tokkyo Koho, 15 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000058117	A2	20000225	JP 1998-218001	199807 31
JP 2983205	B2	19991129	JP 1998-218001	199807 31

PRIORITY APPLN. INFO.: JP 1998-218001

OTHER SOURCE(S): MARPAT 132:154449  
 AB The **batteries** use an electrolyte soln. contg. a Li  
**salt** dissolved in an arom. ether ROR', where R = C<sub>6</sub>H<sub>5</sub>,  
 allyl, or alkylphenyl group; R' = C<sub>1</sub>-6 alkyl, Ph, allyl, or  
 alkylphenyl group; and R and R' may form a C<sub>5</sub>-6 ring.  
 IT 271-89-6, Benzofuran  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte solvents contg. arom. ether derivs. for secondary  
 lithium **batteries**)  
 RN 271-89-6 HCAPLUS  
 CN Benzofuran (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **battery** electrolyte lithium salt arom  
 ether solvent  
 IT **Battery** electrolytes  
 (electrolyte solvents contg. arom. ether derivs. for secondary  
 lithium **batteries**)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
 14283-07-9, Lithium fluoroborate 21324-40-3, Lithium  
 hexafluorophosphate  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte solvents contg. arom. ether derivs. for secondary  
 lithium **batteries**)  
 IT 101-84-8, Diphenyl ether 271-89-6, Benzofuran 557-40-4,  
 Diallyl ether 1579-40-4 3586-14-9 3739-64-8, Butyl allyl ether

RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte solvents contg. arom. ether derivs. for secondary  
 lithium **batteries**)

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L142 ANSWER 1 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1239360 HCAPLUS

DOCUMENT NUMBER: 144:8990

TITLE: Polymer **electrolyte** secondary lithium  
**batteries** with long cycle life and good  
 stability at high temperature

INVENTOR(S): Wada, Yoshihiko; Miura, Katsuhito; Matsui,  
 Shohei; Tabuchi, Masato

PATENT ASSIGNEE(S): Daiso Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokyo Koho, 15 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2005327566	A2	20051124	JP 2004-143916	200405 13
PRIORITY APPLN. INFO.:			JP 2004-143916	200405 13

AB The **batteries** have crosslinked polymer **electrolyte**  
 compns. consisting of (a) multi-component copolymer polyethers with  
 Mw 104-107, (b) aprotic org. solvents, (c) low-mol.-wt. S compds.  
 and/or N compds. as additives, and (d) **Li salts**  
 as **electrolytes**. In the **batteries**, side  
 reactions between electrodes and **electrolytes** are  
 prevented by the additives c.

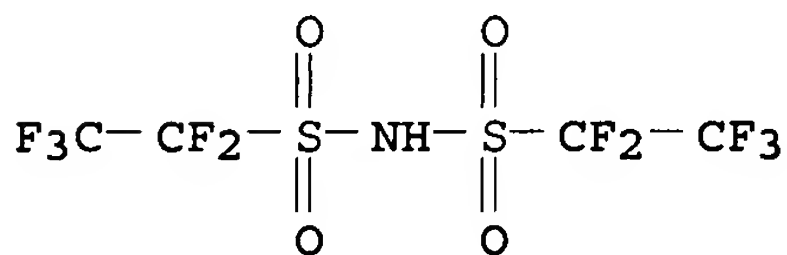
IT 132843-44-8, Lithium bis(perfluoroethylsulfonyl)imide

RL: DEV (Device component use); USES (Uses)

(**electrolytes** contg. polyoxyalkylenes; thermally stable  
 secondary lithium **batteries** contg. sulfur and/or  
 nitrogen compds. in polymer **electrolytes**)

RN 132843-44-8 HCAPLUS

CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-  
 [(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)

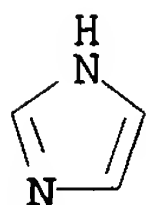


● Li

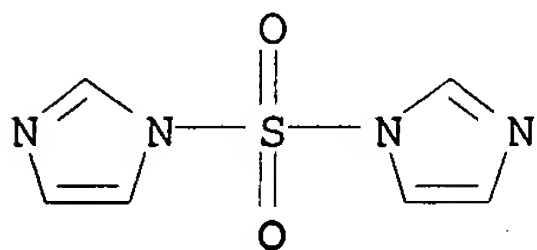
IT 7439-93-2DP, Lithium, complexes with glycidyl  
(meth)acrylate-ethylene oxide copolymers  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(**electrolytes**; thermally stable secondary lithium  
**batteries** contg. sulfur and/or nitrogen compds. in  
polymer **electrolytes**)  
RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 288-32-4D, Imidazole, derivs. 7189-69-7,  
1,1'-Sulfonyldiimidazole  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(thermally stable secondary lithium **batteries** contg.  
sulfur and/or nitrogen compds. in polymer **electrolytes**)  
RN 288-32-4 HCAPLUS  
CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 7189-69-7 HCAPLUS  
CN 1H-Imidazole, 1,1'-sulfonylbis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
ICS C08G065-321; C08K003-00; C08K005-00; C08L071-00; H01M006-18  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST polymer **electrolyte** lithium **battery** thermally  
stable; polyoxyalkylene lithium complex **battery**  
**electrolyte** sulfur nitrogen; secondary **battery**  
polymer **electrolyte** sulfite oxazole  
IT Polyoxyalkylenes, uses  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(acrylic, lithium complexes, **electrolytes**; thermally  
stable secondary lithium **batteries** contg. sulfur and/or  
nitrogen compds. in polymer **electrolytes**)  
IT Polyoxyalkylenes, uses  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(lithium complexes, **electrolytes**; thermally stable  
secondary lithium **batteries** contg. sulfur and/or

- nitrogen compds. in polymer electrolytes)
- IT Secondary batteries  
(lithium; thermally stable secondary lithium batteries  
contg. sulfur and/or nitrogen compds. in polymer  
electrolytes)
- IT Sulfonic acids, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(salts; thermally stable secondary lithium batteries  
contg. sulfur and/or nitrogen compds. in polymer  
electrolytes)
- IT Lactones  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(sultones; thermally stable secondary lithium batteries  
contg. sulfur and/or nitrogen compds. in polymer  
electrolytes)
- IT Battery electrolytes  
Polymer electrolytes  
(thermally stable secondary lithium batteries contg.  
sulfur and/or nitrogen compds. in polymer electrolytes)
- IT Sulfates, uses  
Sulfites  
Sulfones  
Sulfoxides  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(thermally stable secondary lithium batteries contg.  
sulfur and/or nitrogen compds. in polymer electrolytes)
- IT 815574-41-5DP, lithium complexes 815574-42-6DP, lithium complexes  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(crosslinked, electrolytes; thermally stable secondary  
lithium batteries contg. sulfur and/or nitrogen compds.  
in polymer electrolytes)
- IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
108-32-7, Propylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solvents; thermally stable secondary  
lithium batteries contg. sulfur and/or nitrogen compds.  
in polymer electrolytes)
- IT 14283-07-9, Lithium tetrafluoroborate 132843-44-8, Lithium  
bis(perfluoroethylsulfonyl)imide  
RL: DEV (Device component use); USES (Uses)  
(electrolytes contg. polyoxyalkylenes; thermally stable  
secondary lithium batteries contg. sulfur and/or  
nitrogen compds. in polymer electrolytes)
- IT 7439-93-2DP, Lithium, complexes with glycidyl  
(meth)acrylate-ethylene oxide copolymers 26282-59-7DP, lithium  
complexes  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(electrolytes; thermally stable secondary lithium  
batteries contg. sulfur and/or nitrogen compds. in  
polymer electrolytes)
- IT 120-72-9D, Indole, derivs. 288-14-2D, Isoxazole, derivs.  
288-32-4D, Imidazole, derivs. 288-42-6, Oxazole  
289-80-5D, Pyridazine, derivs. 289-95-2D, Pyrimidine, derivs.  
290-37-9D, Pyrazine, derivs. 352-93-2, Diethyl sulfide 597-35-3,  
Diethyl sulfone 617-92-5, 1-Ethylpyrrole 1600-44-8,

Tetramethylene sulfoxide 1633-83-6, 1,4-Butanesultone 3741-38-6,  
Glycol sulfite 7189-69-7, 1,1'-Sulfonyldiimidazole  
12654-97-6D, Triazine, derivs. 74124-79-1, N,N'-Disuccinimidyl  
carbonate

RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)

(thermally stable secondary lithium batteries contg.  
sulfur and/or nitrogen compds. in polymer electrolytes)

L142 ANSWER 2 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:160702 HCAPLUS

DOCUMENT NUMBER: 142:243650

TITLE: **Electrolyte composition for lithium  
battery**

INVENTOR(S): Roh, Kwon Sun; Choi, Jong Hyuk; Park, Chi Kyun;  
Lee, Jon Ha

PATENT ASSIGNEE(S): SKC Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 5 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2005042519	A1	20050224	US 2004-920162	200408 18
CN 1612403	A	20050504	CN 2004-10092105	200408 19
PRIORITY APPLN. INFO.:				KR 2003-57276 A 200308 19

AB An **electrolyte** compn., a lithium **battery** using  
the **electrolyte** compn., and a method of manufg. the  
lithium **battery** are provided. The **electrolyte**  
compn. includes: a lithium salt, and an org.  
solvent contg. a nitrogen-contg. compd., propane sultone, and  
vinylene carbonate and/or cyclohexylbenzene. The  
**electrolyte** compn. ensures a **battery** safety when  
operated at high temp. without performance degrdn.

IT 7439-93-2D, Lithium, salt  
7791-03-9, Lithium perchlorate 33454-82-9, Lithium  
triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)

(**electrolyte** compn. for lithium **battery**)

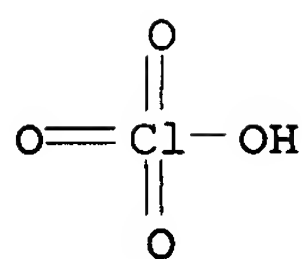
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

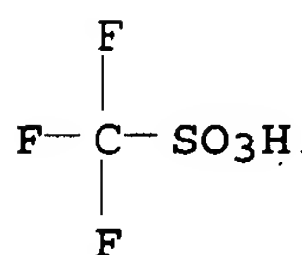
RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



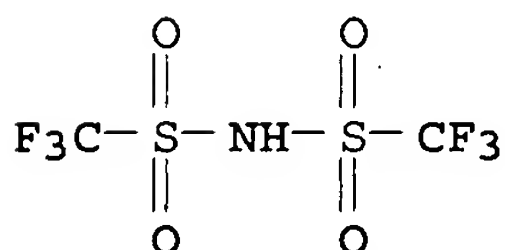
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



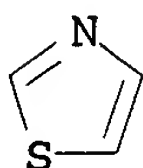
● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 288-47-1, Thiazole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte compn. for lithium battery)  
 RN 288-47-1 HCAPLUS  
 CN Thiazole (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M010-04  
 INCL 429330000; 429326000; 429314000; 029623200  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)



ST electrolyte compn lithium battery; safety  
electrolyte compn lithium battery

IT Heterocyclic compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(arom.; electrolyte compn. for lithium battery  
)

IT Battery electrolytes  
Safety  
(electrolyte compn. for lithium battery)

IT Epoxides  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte compn. for lithium battery)

IT Aromatic compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(heterocyclic; electrolyte compn. for lithium  
battery)

IT Secondary batteries  
(lithium; electrolyte compn. for lithium  
battery)

IT Amines, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(polymers; electrolyte compn. for lithium  
battery)

IT Amines, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(primary; electrolyte compn. for lithium  
battery)

IT Amines, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(secondary; electrolyte compn. for lithium  
battery)

IT Amines, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(tertiary; electrolyte compn. for lithium  
battery)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
108-32-7, Propylene carbonate 7439-93-2D, Lithium  
, salt 7440-44-0, Carbon, uses 7791-03-9,  
Lithium perchlorate 9002-88-4, Polyethylene 9003-07-0,  
Polypropylene 12190-79-3, Cobalt lithium oxide (CoLiO2)  
14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium  
hexafluoro antimonate 21324-40-3, Lithium hexafluorophosphate  
29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium  
triflate 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(electrolyte compn. for lithium battery)

IT 110-86-1, Pyridine, uses 288-47-1, Thiazole 289-06-5,  
Thiadiazole 289-80-5, Pyridazine 289-95-2, Pyrimidine  
290-37-9, Pyrazine 827-52-1, Cyclohexylbenzene 872-36-6,  
Vinylene carbonate 1120-71-4, Propane sultone 2425-79-8,  
1,4-Butanediol diglycidyl ether 12654-97-6, Triazine 24980-54-9,  
Styrene-2-vinylpyridine copolymer 37306-44-8, Triazole  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte compn. for lithium battery)

L142 ANSWER 3 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2004:904490 HCAPLUS  
DOCUMENT NUMBER: 141:359083  
TITLE: Polymer solid electrolytes with high  
ion conductivity



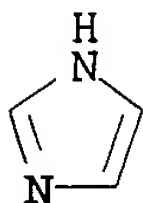
INVENTOR(S): Matsuyama, Mutsuhiro; Watanabe, Takeshi  
 PATENT ASSIGNEE(S): Sumitomo Bakelite Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004303492	A2	20041028	JP 2003-92927	20030328
PRIORITY APPLN. INFO.:			JP 2003-92927	20030328

AB The **electrolytes** contain imidazolium salts contg.  $\geq 2$  polymerizable groups or their derivs. The **electrolytes** may contain homopolymers of the above compds. or their copolymers with other monomers. Preferably, the **electrolytes** contain alkali metal salts. The **electrolytes** have high flexibility, mech. strength, storage stability, leak resistance, etc., and are suitable for **batteries**, capacitors, solar cells, gel actuators, etc.

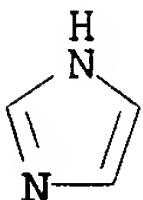
IT 288-32-4DP, Imidazole, Bis(styrylmethyl) quaternary ammonium chlorides and bis(trifluoromethanesulfone)imides, polymer derivs.  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid **electrolytes** with high ion cond.)

RN 288-32-4 HCAPLUS  
 CN 1H-Imidazole (9CI) (CA INDEX NAME)



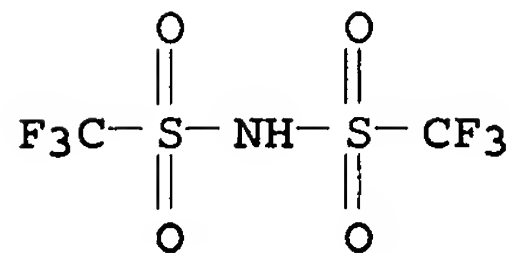
IT 288-32-4, Imidazole, reactions 90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid **electrolytes** with high ion cond.)

RN 288-32-4 HCAPLUS  
 CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,

lithium salt (9CI) (CA INDEX NAME)



● Li

- IT 7439-93-2DP, Lithium, acrylic imidazolium polymer complex  
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)
- RN 7439-93-2 HCAPLUS
- CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)
- Li
- IC ICM H01B001-06  
 ICS C08G061-12; H01M010-40
- CC 76-2 (Electric Phenomena)  
 Section cross-reference(s): 38
- ST polymer solid electrolyte imidazolium polymerizable group;  
 ion cond polymerizable imidazolium salt polymer electrolyte
- IT Polymer electrolytes  
 (polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)
- IT 288-32-4DP, Imidazole, Bis(styrylmethyl) quaternary ammonium chlorides and bis(trifluoromethanesulfone)imides, polymer derivs.  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)
- IT 288-32-4, Imidazole, reactions 1592-20-7,  
 p-Chloromethylstyrene 90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)
- IT 97-90-5DP, Ethylene glycol dimethacrylate, polymer derivs. with acryloylmorpholine, acryloyloxypropyltrimethylammonium bis(trifluoromethanesulfonyl)imide, and bis(styrylmethyl)imidazolium bis(trifluoromethanesulfone)imide, lithium complexes 5117-12-4DP, Acryloylmorpholine, polymer derivs. with acryloyloxypropyltrimethylammonium bis(trifluoromethanesulfone)imide, bis(styrylmethyl)imidazolium bis(trifluoromethanesulfone)imide, and ethylene glycol dimethacrylate, lithium complexes  
 7439-93-2DP, Lithium, acrylic imidazolium polymer complex  
 676578-35-1DP, polymer derivs. with acryloylmorpholine, bis(styrylmethyl)imidazolium bis(trifluoromethanesulfone)imide, and ethylene glycol dimethacrylate, lithium complexes  
 RL: IMF (Industrial manufacture); TEM (Technical or engineered

material use); PREP (Preparation); USES (Uses)  
 (polymerizable imidazolium salt-based polymer solid  
 electrolytes with high ion cond.)

L142 ANSWER 4 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:392771 HCAPLUS  
 DOCUMENT NUMBER: 140:378118  
 TITLE: **Electrolyte** composition for lithium  
 secondary **battery** having high  
 overcharge-safety  
 INVENTOR(S): Roh, Kwonsun; Choi, Jonghyuk; Lee, Jaemyoung;  
 Lee, Jonha  
 PATENT ASSIGNEE(S): SKC Limited, S. Korea  
 SOURCE: PCT Int. Appl., 15 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

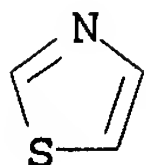
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004040687	A1	20040513	WO 2003-KR2274	200310 27
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
KR 2004037534	A	20040507	KR 2002-66067	200210 29
AU 2003272137	A1	20040525	AU 2003-272137	200310 27
PRIORITY APPLN. INFO.:				200210 29
KR 2002-66067				A
WO 2003-KR2274				W
				200310 27

AB An **electrolyte** compn. comprising a nitrogen-contg. compd.,  
 cyclohexyl benzene, an org. solvent and a **lithium**  
**salt** is advantageously used for the prepn. of a lithium  
 secondary **battery** having high overcharge-safety, cycling  
 life and high-temp. swelling properties at the same time.  
 IT 288-47-1, Thiazole 7439-93-2D, **Lithium**,  
**salt** 7791-03-9, Lithium perchlorate  
 33454-82-9, Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)  
(electrolyte compn. for lithium secondary  
battery having high overcharge-safety)

RN 288-47-1 HCAPLUS

CN Thiazole (6CI, 8CI, 9CI) (CA INDEX NAME)



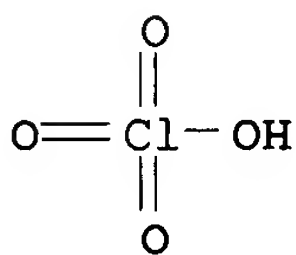
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

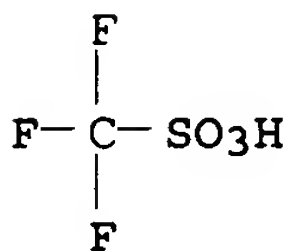
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCAPLUS

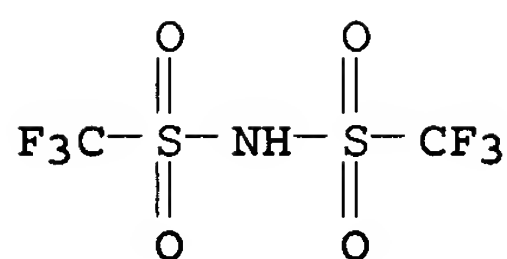
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

- IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **electrolyte** compn lithium secondary **battery** high overcharge safety  
 IT **Battery electrolytes**  
 Safety  
 (electrolyte compn. for lithium secondary **battery** having high overcharge-safety)  
 IT Polymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary **battery** having high overcharge-safety)  
 IT Epoxy resins, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte compn. for lithium secondary **battery** having high overcharge-safety)  
 IT Secondary **batteries**  
 (lithium; **electrolyte** compn. for lithium secondary **battery** having high overcharge-safety)  
 IT Heterocyclic compounds  
 RL: DEV (Device component use); USES (Uses)  
 (nitrogen; **electrolyte** compn. for lithium secondary **battery** having high overcharge-safety)  
 IT Amines, uses  
 RL: DEV (Device component use); USES (Uses)  
 (tertiary; **electrolyte** compn. for lithium secondary **battery** having high overcharge-safety)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 110-86-1, Pyridine, uses 121-44-8, Triethylamine, uses  
 288-47-1, Thiazole 289-06-5, Thiadiazole 289-80-5,  
 Pyridazine 289-95-2, Pyrimidine 290-37-9D, Pyrazine, salt  
 616-38-6, Dimethyl carbonate 827-52-1, Cyclohexylbenzene  
 2425-79-8, 1,4-Butanediol diglycidyl ether 7439-93-2D,  
 Lithium, salt 7727-37-9D, Nitrogen, compd.  
 7791-03-9, Lithium perchlorate 9003-47-8,  
 Polyvinylpyridine 9019-70-9, Styrene-vinylpyridine copolymer  
 12190-79-3, Cobalt lithium oxide colio2 12654-97-6, Triazine  
 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium  
 hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate  
 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium  
 triflate 37306-44-8, Triazole 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary **battery** having high overcharge-safety)  
 IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (mesocarbon microbeads; **electrolyte** compn. for lithium secondary **battery** having high overcharge-safety)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN  
THE RE FORMAT

L142 ANSWER 5 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:41827 HCAPLUS

DOCUMENT NUMBER: 140:79851

TITLE: **Electrolyte** composition for lithium  
secondary **battery** having high  
overcharge-safety

INVENTOR(S): Park, Chi-Kyun; Zhang, Zhiwei; Chai, Chul; Lee,  
Jonha; Roh, Kwonsun

PATENT ASSIGNEE(S): SKC Limited, S. Korea

SOURCE: PCT Int. Appl., 18 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2004006378	A1	20040115	WO 2003-KR1332	200307 07
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
KR 2004006057	A	20040124	KR 2002-39570	200207 09
AU 2003281410	A1	20040123	AU 2003-281410	200307 07
PRIORITY APPLN. INFO.:			KR 2002-39570	A 200207 09
			WO 2003-KR1332	W 200307 07

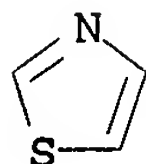
AB An **electrolyte** compn. comprising a nitrogen-contg. compd.,  
biphenyl, an org. solvent and a **lithium salt** is  
advantageously used for the prepn. of a lithium secondary  
**battery** having high overcharge-safety, cycling life and  
capacity properties.

IT 288-47-1, Thiazole 7439-93-2D, Lithium,  
salt 7791-03-9, Lithium perchlorate  
33454-82-9, Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)

RN 288-47-1 HCAPLUS

CN Thiazole (6CI, 8CI, 9CI) (CA INDEX NAME)



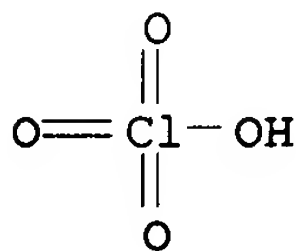
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

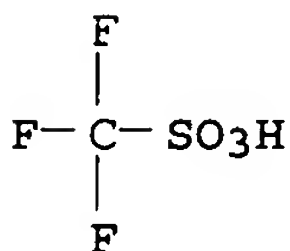
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCAPLUS

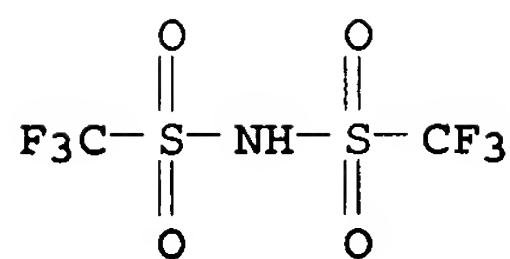
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

- IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **electrolyte** compn lithium secondary **battery** high  
 overcharge safety  
 IT **Battery electrolytes**  
 Safety  
 (electrolyte compn. for lithium secondary  
**battery** having high overcharge-safety)  
 IT Epoxides  
 Halogen compounds  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
**battery** having high overcharge-safety)  
 IT Secondary **batteries**  
 (lithium; **electrolyte** compn. for lithium secondary  
**battery** having high overcharge-safety)  
 IT Heterocyclic compounds  
 RL: DEV (Device component use); USES (Uses)  
 (nitrogen, arom.; **electrolyte** compn. for lithium  
 secondary **battery** having high overcharge-safety)  
 IT Heterocyclic compounds  
 RL: DEV (Device component use); USES (Uses)  
 (polymers, nitrogen-contg., arom.; **electrolyte** compn.  
 for lithium secondary **battery** having high  
 overcharge-safety)  
 IT Amines, uses  
 RL: DEV (Device component use); USES (Uses)  
 (tertiary; **electrolyte** compn. for lithium secondary  
**battery** having high overcharge-safety)  
 IT 92-52-4, Biphenyl, uses 96-49-1, Ethylene carbonate 105-58-8,  
 Diethyl carbonate 110-86-1, Pyridine, uses 121-44-8,  
 Triethylamine, uses 288-47-1, Thiazole 289-06-5,  
 Thiadiazole 289-80-5, Pyridazine 289-95-2, Pyrimidine  
 290-37-9, Pyrazine 616-38-6, Dimethyl carbonate 7439-93-2D  
 , Lithium, salt 7791-03-9, Lithium  
 perchlorate 9003-47-8, Polyvinylpyridine 9019-70-9,  
 Styrene-vinylpyridine copolymer 12190-79-3, Cobalt lithium oxide  
 colio2 12654-97-6, Triazine 14283-07-9, Lithium  
 tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate  
 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium  
 hexafluoroarsenate 33454-82-9, Lithium triflate  
 37306-44-8, Triazole 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
**battery** having high overcharge-safety)  
 IT 2386-87-0, 3,4-Epoxy cyclohexylmethyl-3',4'-epoxycyclohexane  
 carboxylate  
 RL: MOA (Modifier or additive use); USES (Uses)



(**electrolyte** compn. for lithium secondary  
**battery** having high overcharge-safety)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); USES (Uses)

(mesocarbon microbeads; **electrolyte** compn. for lithium  
secondary **battery** having high overcharge-safety)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN  
THE RE FORMAT

L142 ANSWER 6 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:830910 HCAPLUS

DOCUMENT NUMBER: 140:62227

TITLE: The use of ionic liquids in polymer gel  
**electrolytes**

AUTHOR(S): De Long, Hugh C.; Trulove, Paul C.; Sutto,  
Thomas E.

CORPORATE SOURCE: Air Force Office of Scientific Research,  
Arlington, VA, 22203-1977, USA

SOURCE: ACS Symposium Series (2003), 856(Ionic Liquids  
as Green Solvents), 478-494  
CODEN: ACSMC8; ISSN: 0097-6156

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Polymer gel **electrolytes** composed of 1,2-dimethyl-3-n-  
alkyl-imidazolium bis-trifluoromethanesulfonylimide (alkyl = Pr or  
butyl) and polyvinylidenedifluoro-hexafluoropropylene are  
characterized by ac-impedance and cyclic voltammetry. Two electrode  
charge-discharge expts. were also performed using graphitic paper or  
Li metal as the anode, and polymer composites of LiMn2O4, LiCoO2, or  
V2O5 as cathodes. Results indicated that the polymer composite gel  
**electrolytes** were stable for over 50 cycles when used in  
direct contact with Li metal. High efficiencies and low voltage  
drop-offs indicate that polymer gel composite electrodes composed of  
these ionic liqs. are a viable alternative to the more common org.  
solvent **electrolytes**.

IT 1739-84-0, 1,2-Dimethylimidazole 90076-65-6,

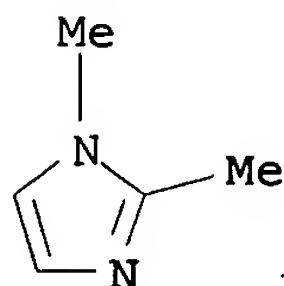
Lithium bistrifluoromethanesulfonylimide

RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
process); PROC (Process)

(ionic liqs. in polymer gel **battery**  
**electrolytes**)

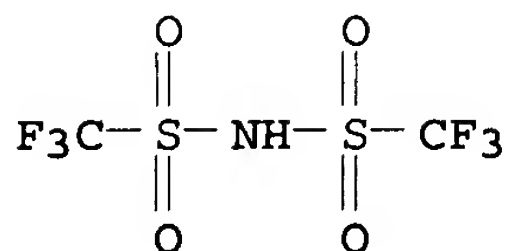
RN 1739-84-0 HCAPLUS

CN 1H-Imidazole, 1,2-dimethyl- (9CI) (CA INDEX NAME)



RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
lithium salt (9CI) (CA INDEX NAME)



● Li

- IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (ionic liqs. in polymer gel **battery**  
**electrolytes**)
- RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)
- Li
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38
- ST ionic liq polymer gel **battery electrolyte**
- IT Polymers, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (gels; ionic liqs. in polymer gel **battery**  
**electrolytes**)
- IT **Battery electrolytes**  
 Cyclic voltammetry  
 Ionic conductivity  
 Ionic liquids  
 Solid **electrolytes**  
 (ionic liqs. in polymer gel **battery**  
**electrolytes**)
- IT **Secondary batteries**  
 (lithium; ionic liqs. in polymer gel **battery**  
**electrolytes**)
- IT Salts, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (org., molten; ionic liqs. in polymer gel **battery**  
**electrolytes**)
- IT 108-10-1, 4-Methyl-2-pentanone 109-69-3, 1-Chlorobutane  
 540-54-5, 1-Chloropropane 1739-84-0, 1,2-Dimethylimidazole  
 16941-11-0, Ammonium hexafluorophosphate 90076-65-6,  
 Lithium bistrifluoromethanesulfonylimide  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
 process); PROC (Process)  
 (ionic liqs. in polymer gel **battery**  
**electrolytes**)
- IT 1314-62-1, Vanadium oxide V2O5, uses 7439-93-2, Lithium,  
 uses 9011-17-0 12057-17-9, Lithium manganese oxide LiMn2O4  
 12190-79-3, Lithium cobalt oxide LiCoO2 169051-76-7 350493-08-2  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (ionic liqs. in polymer gel **battery**

**electrolytes)**

IT 7782-42-5, Graphite, uses

RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
(Technical or engineered material use); USES (Uses)(paper; ionic liqs. in polymer gel **battery**  
**electrolytes)**REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L142 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:665699 HCAPLUS

DOCUMENT NUMBER: 133:254952

TITLE: Polymer **electrolyte** for lithium  
secondary **batteries**

INVENTOR(S): Oyama, Noboru

PATENT ASSIGNEE(S): Japan

SOURCE: Eur. Pat. Appl., 32 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1037294	A2	20000920	EP 2000-105773	200003 17
EP 1037294	A3	20030730		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2001189166	A2	20010710	JP 2000-70790	200003 14
CA 2301414	AA	20000917	CA 2000-2301414	200003 16
US 6509122	B1	20030121	US 2000-527569	200003 16
CN 1267683	A	20000927	CN 2000-104319	200003 17
AU 770639	B2	20040226	AU 2000-22331	200003 17
US 2003082458	A1	20030501	US 2002-227532	200208 26
PRIORITY APPLN. INFO.:			JP 1999-71758	A 199903 17
			JP 1999-295503	A 199910 18
			US 2000-527569	A3

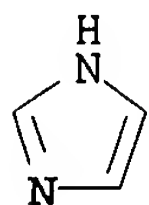
200003

16

AB A polymer **electrolyte** providing lithium secondary **batteries** in which growth of lithium dendrites is suppressed and **batteries** exhibiting excellent discharge characteristics in low to high temp., comprises a polymer gel holding a nonaq. solvent contg. an **electrolyte**. The polymer gel comprises (I) a unit derived from at least one monomer having one copolymerizable vinyl group and (II) a unit derived from at least one compd. selected from the group consisting of (II-a) a compd. having two acryloyl groups and a (poly)oxyethylene group, (II-b) a compd. having one acryloyl group and a (poly)oxyethylene group, and (II-c) a glycidyl ether compd., particularly the polymer gel comprises monomer (I), compd. (II-a), and a copolymerizable plasticizing compd.

IT 288-32-4D, Imidazole, alkyl deriv. 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 131651-65-5  
 RL: DEV (Device component use); USES (Uses)  
 (polymer **electrolyte** for lithium secondary **batteries**)

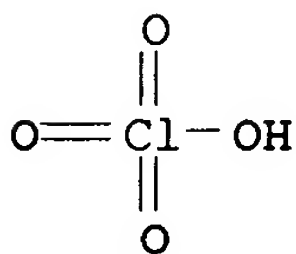
RN 288-32-4 HCAPLUS  
 CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

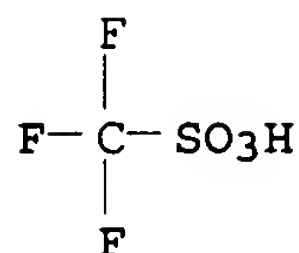
Li

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



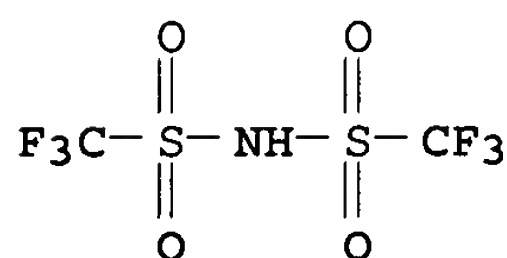
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



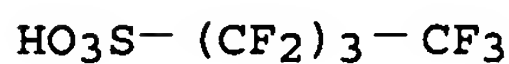
● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)



● Li

RN 131651-65-5 HCAPLUS  
 CN 1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, lithium salt  
 (9CI) (CA INDEX NAME)



● Li

IC ICM H01M006-18  
 ICS C08L071-02  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38, 76  
 ST lithium **battery** polymer **electrolyte**  
 IT Pyridinium compounds  
 RL: DEV (Device component use); USES (Uses)  
 (alkyl; polymer **electrolyte** for lithium secondary  
**batteries**)  
 IT Secondary **batteries**  
 (lithium; polymer **electrolyte** for lithium secondary  
**batteries**)  
 IT **Battery electrolytes**  
 Capacitors  
 Polymer **electrolytes**  
 (polymer **electrolyte** for lithium secondary  
**batteries**)  
 IT Amides, uses  
 Lactones  
 Nitriles, uses  
 Polyanilines

RL: DEV (Device component use); USES (Uses)  
 (polymer **electrolyte** for lithium secondary  
**batteries**)

IT Phosphonium compounds

Quaternary ammonium compounds, uses

RL: DEV (Device component use); USES (Uses)

(tetraalkyl; polymer **electrolyte** for lithium secondary  
**batteries**)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
 108-32-7, Propylene carbonate 288-32-4D, Imidazole, alkyl  
 deriv. 1072-71-5, 2,5-Dimercapto-1,3,4-thiadiazole  
 7439-93-2, Lithium, uses 7791-03-9, Lithium  
 perchlorate 9063-88-1, Blemmer PDE 400-methyl methacrylate  
 copolymer 14283-07-9, Lithium tetrafluoroborate 21324-40-3,  
 Lithium hexafluorophosphate 25101-19-3, Methylmethacrylate-  
 triethylene glycol dimethacrylate copolymer 25233-30-1,  
 Polyaniline 25777-71-3, Blemmer PDE 50-methyl methacrylate  
 copolymer 27308-26-5, Blemmer PDE 100-methyl methacrylate  
 copolymer 29403-27-8 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 35895-69-3,  
 Tetraethylammonium trifluoromethanesulfonate 59049-11-5, Blemmer  
 PME 150-methyl methacrylate copolymer 72892-39-8, Blemmer PE  
 200-methyl methacrylate copolymer 81381-02-4, Acrylonitrile-  
 triethylene glycol dimethacrylate copolymer 90076-65-6  
 114388-54-4, Cyclohexyl methacrylate-methyl methacrylate-triethylene  
 glycol dimethacrylate copolymer 129283-05-2 130425-25-1, Blemmer  
 PME 100-methyl methacrylate copolymer 131651-65-5  
 132404-42-3 144442-23-9 294189-08-5 294189-09-6, Methyl  
 methacrylate-2-methacryloyloxyethyl phthalate-triethylene glycol  
 dimethacrylate copolymer 294189-10-9, Benzyl methacrylate-methyl  
 methacrylate-triethylene glycol dimethacrylate copolymer  
 294189-11-0, Isobornyl methacrylate-methyl methacrylate-triethylene  
 glycol dimethacrylate copolymer 294189-12-1 294189-13-2  
 294189-14-3, 2-Diethylaminoethyl methacrylate-methyl  
 methacrylate-triethylene glycol dimethacrylate copolymer  
 294189-15-4, Methyl methacrylate-triethylene glycol  
 dimethacrylate-trifluoroethyl methacrylate copolymer 294189-16-5,  
 Diethylene glycol monomethacrylate-methyl methacrylate-triethylene  
 glycol dimethacrylate copolymer 294189-17-6, Methoxyethyleneglycol  
 methacrylate-methyl methacrylate-triethylene glycol dimethacrylate  
 copolymer 294189-18-7 294189-20-1

RL: DEV (Device component use); USES (Uses)  
 (polymer **electrolyte** for lithium secondary  
**batteries**)

IT 78-67-1, AIBN

RL: TEM (Technical or engineered material use); USES (Uses)

(polymn. initiator; polymer **electrolyte** for lithium  
 secondary **batteries**)

L142 ANSWER 8 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:808567 HCAPLUS

DOCUMENT NUMBER: 132:24879

TITLE: Solid polymer **electrolyte** rechargeable  
**batteries** containing a redox shuttle  
 additive for overcharge protection

INVENTOR(S): Richardson, Thomas J.; Ross, Philip N.

PATENT ASSIGNEE(S): United States Dept. of Energy, USA

SOURCE: U.S., 7 pp.  
 CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

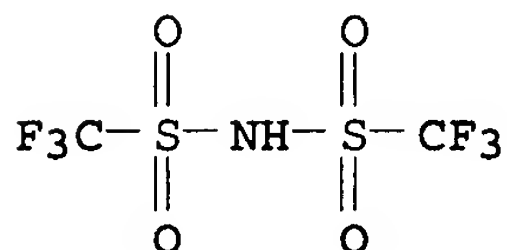
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6004698	A	19991221	US 1997-915612	19970821
PRIORITY APPLN. INFO.:			US 1997-915612	19970821

AB A class of org. redox shuttle additives is described, preferably comprising nitrogen-contg. aroms. compds., which can be used in a high temp. (85° or higher) **battery** comprising a cathode, an anode, and a solid polymer **electrolyte** to provide overcharge protection to the cell. The org. redox additives or shuttles are characterized by a high diffusion coeff. of at least  $2.1 \times 10^{-8}$  cm<sup>2</sup>/s and a high onset potential of 2.5 V or higher. Examples of such org. redox shuttle additives include an alkali metal salt of 1,2,4-triazole, an alkali metal salt of imidazole, 2,3,5,6-tetramethylpyrazine, 1,3,5-tricyanobenzene, and a dialkali metal salt of 3-4-dihydroxy-3-cyclobutene-1,2-dione.

IT 7439-93-2, Lithium, uses 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge protection)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

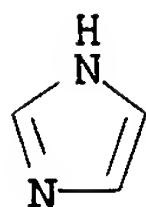
RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 288-32-4D, Imidazole, alkali metal salt  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge protection)  
 RN 288-32-4 HCAPLUS  
 CN 1H-Imidazole (9CI) (CA INDEX NAME)





IC ICM H01M006-18  
 INCL 429305000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **battery** redox shuttle additive overcharge protection  
 IT Polyoxyalkylenes, uses  
 RL: DEV (Device component use); USES (Uses)  
 (lithium complex, trifluoromethane sulfonimide contg.; solid  
 polymer **electrolyte** rechargeable **batteries**  
 contg. redox shuttle additive for overcharge protection)  
 IT Secondary **batteries**  
 (lithium; solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge  
 protection)  
 IT Secondary **batteries**  
 (solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge  
 protection)  
 IT 7439-93-2, Lithium, uses 90076-65-6 127575-11-5,  
 Lithium manganese oxide  $\text{Li}_2\text{Mn}_4\text{O}_9$   
 RL: DEV (Device component use); USES (Uses)  
 (solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge  
 protection)  
 IT 288-32-4D, Imidazole, alkali metal salt 288-88-0D,  
 1H-1,2,4-Triazole, alkali metal salt 1124-11-4 1518-16-7, Tcnq  
 2892-51-5D, dialkali metal salt 5587-42-8, Sodium imidazole  
 7440-44-0, Carbon, uses 10365-94-3, 1,3,5-Tricyanobenzene  
 41253-21-8, Sodium 1,2,4-Triazole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge  
 protection)  
 IT 25322-68-3D, Peo, lithium complex  
 RL: DEV (Device component use); USES (Uses)  
 (trifluoromethane sulfonimide contg.; solid polymer  
**electrolyte** rechargeable **batteries** contg. redox  
 shuttle additive for overcharge protection)  
 REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L142 ANSWER 9 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1992:135528 HCAPLUS  
 DOCUMENT NUMBER: 116:135528  
 TITLE: Performance-oriented packaging standards;  
 changes to classification, hazard communication,  
 packaging and handling requirements based on UN  
 standards and agency initiative  
 CORPORATE SOURCE: United States Dept. of Transportation,  
 Washington, DC, 20590-0001, USA  
 SOURCE: Federal Register (1990), 55(246), 52402-729, 21  
 Dec 1990



CODEN: FEREAC; ISSN: 0097-6326

DOCUMENT TYPE: Journal

LANGUAGE: English

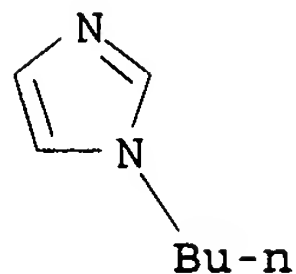
AB The hazardous materials regulations under the Federal Hazardous Materials Transportation Act are revised based on the United Nations recommendations on the transport of dangerous goods. The regulations cover the classification of materials, packaging requirements, and package marking, labeling, and shipping documentation, as well as transportation modes and handling, and incident reporting. Performance-oriented stds. are adopted for packaging for bulk and nonbulk transportation, and SI units of measurement generally replace US customary units. Hazardous material descriptions and proper shipping names are tabulated together with hazard class, identification nos., packing group, label required, special provisions, packaging authorizations, quantity limitations, and vessel stowage requirements.

IT 4316-42-1, N-n-Butylimidazole 7439-93-2, Lithium, miscellaneous 7439-93-2D, Lithium, alkyl derivs. 7790-69-4, Lithium nitrate 13840-33-0, Lithium hypochlorite 13840-33-0D, Lithium hypochlorite, mixts. RL: ADV (Adverse effect, including toxicity); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process)

(packaging and transport of, stds. for)

RN 4316-42-1 HCAPLUS

CN 1H-Imidazole, 1-butyl- (9CI) (CA INDEX NAME)



RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

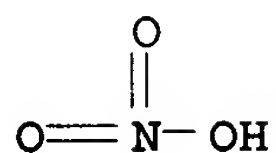
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7790-69-4 HCAPLUS

CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 13840-33-0 HCAPLUS  
 CN Hypochlorous acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

Cl-OH

● Li

RN 13840-33-0 HCAPLUS  
 CN Hypochlorous acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

Cl-OH

● Li

CC 59-6 (Air Pollution and Industrial Hygiene)  
 IT Adhesives  
 Alcoholic beverages  
 Ammunition  
 Antifreeze substances  
 Bactericides, Disinfectants, and Antiseptics  
 Batteries, primary  
 Blasting gelatin  
 Bombs (explosives)  
 Carbon paper  
 Cartridges  
 Castor bean  
 Coating materials  
 Corrosive substances  
 Cotton  
 Creosote  
 Detonators  
 Dyes  
 Dynamite  
 Electric fuses  
 Exothermic materials  
 Explosives  
 Flavoring materials  
 Flue dust  
 Fuel cells  
 Fuel oil  
 Fuels, diesel  
 Fuels, jet aircraft

Fusel oil  
 Fuses, explosives  
 Gas oils  
 Hay  
 Herbicides  
 Igniters and Lighters  
 Insecticides  
 Lacrimators  
 Magnetic substances  
 Matches  
 Oxidizing agents  
 Perfumes  
 Pesticides  
 Petroleum products  
 Pharmaceuticals  
 Photoelectric devices  
 Poisons  
 Primers, explosive  
 Projectiles  
 Pyrophoric substances  
 Pyrotechnic compositions  
 Radioactive substances  
 Refrigerating apparatus  
 Rockets  
 Shale oils  
 Solvent naphtha  
 Sprays  
 Straw  
 Textiles  
 Thermoelectric devices  
 Torpedoes (weapons)  
 Turpentine  
 Wood preservatives

(packaging and transport of, stds. for)

IT 1002-16-0, Amyl nitrate 1070-19-5, tert-Butoxycarbonyl azide  
 1120-21-4, Undecane 1125-27-5 1126-78-9 1187-93-5,  
 Perfluoromethyl vinyl ether 1299-86-1, Aluminum carbide  
 1300-64-7, Anisoyl chloride 1300-71-6, Xylenol 1300-73-8D,  
 derivs. 1303-28-2, Arsenic pentoxide 1303-33-9, Arsenic sulfide  
 1303-33-9D, Arsenic sulfide, mixt. with chlorates 1304-28-5,  
 Barium oxide, miscellaneous 1304-29-6, Barium peroxide  
 1305-78-8, Calcium oxide, miscellaneous 1305-79-9, Calcium  
 peroxide 1305-99-3, Calcium phosphide 1309-60-0, Lead dioxide  
 1310-58-3, Potassium hydroxide, miscellaneous 1310-65-2, Lithium  
 hydroxide 1310-73-2, Sodium hydroxide, miscellaneous 1310-82-3,  
 Rubidium hydroxide 1312-73-8, Potassium sulfide 1313-60-6,  
 Sodium peroxide 1313-82-2, Sodium sulfide, miscellaneous  
 1314-18-7, Strontium peroxide 1314-22-3, Zinc peroxide  
 1314-24-5, Phosphorus trioxide 1314-34-7, Vanadium trioxide  
 1314-56-3, Phosphorus pentoxide, miscellaneous 1314-62-1, Vanadium  
 pentoxide, miscellaneous 1314-80-3, Phosphorus sulfide (P2S5)  
 1314-84-7, Zinc phosphide 1314-85-8, Phosphorus sesquisulfide  
 1319-77-3, Cresylic acid 1320-37-2, Dichlorotetrafluoroethane  
 1321-10-4, Chlorocresol 1321-31-9, Phenetidine 1327-53-3,  
 Arsenic trioxide 1330-20-7, Xylene, miscellaneous 1330-45-6,  
 Chlorotrifluoroethane 1330-78-5, Tricresyl phosphate 1331-22-2,  
 Methyl cyclohexanone 1332-12-3, Fulminating gold 1332-37-2, Iron  
 oxide, properties 1333-39-7, Phenolsulfonic acid 1333-41-1,  
 Picoline 1333-74-0, Hydrogen, miscellaneous 1333-82-0, Chromium  
 trioxide 1333-83-1, Sodium hydrogen fluoride 1335-26-8,

Magnesium peroxide 1335-31-5, Mercury oxycyanide 1335-85-9,  
Dinitro-o-cresol 1336-21-6, Ammonium hydroxide 1337-81-1  
1338-23-4, Methyl ethyl ketone peroxide 1341-24-8,  
Chloroacetophenone 1341-49-7, Ammonium hydrogen fluoride  
1344-40-7, Lead phosphite, dibasic 1344-67-8, Copper chloride  
1498-40-4, Ethyl phosphonous dichloride 1498-51-7, Ethyl  
phosphorodichloridate 1569-69-3, Cyclohexyl mercaptan 1609-86-5,  
tert-Butyl isocyanate 1623-15-0 1623-24-1, Isopropyl acid  
phosphate 1634-04-4, Methyl-tert-butyl ether 1693-71-6, Triallyl  
borate 1705-60-8, 2,2-Di(4,4-di-tert-butylperoxycyclohexyl)propane  
1712-64-7, Isopropyl nitrate 1719-53-5, Diethyldichlorosilane  
1737-93-5, 3,5-Dichloro-2,4,6-trifluoropyridine 1789-58-8,  
Ethyldichlorosilane 1795-48-8, Isopropyl isocyanate 1838-59-1,  
Allyl formate 1873-29-6, Isobutyl isocyanate 1885-14-9,  
Phenylchloroformate 1947-27-9, Arsenic trichloride 2050-92-2,  
Di-n-amylamine 2094-98-6, 1,1'-Azodi(hexahydrobenzonitrile)  
2144-45-8, Dibenzyl peroxydicarbonate 2155-71-7 2167-23-9,  
2,2-Di(tert-butylperoxy)butane 2217-06-3, Dipicryl sulfide  
2243-94-9, 1,3,5-Trinitronaphthalene 2244-21-5, Potassium  
dichloroisocyanurate 2294-47-5, p-Diazidobenzene 2312-76-7  
2338-12-7, 5-Nitrobenzotriazole 2487-90-3, Trimethoxysilane  
2508-19-2, Trinitrobenzenesulfonic acid 2524-03-0, Dimethyl  
chlorothiophosphate 2524-04-1, Diethylthiophosphoryl chloride  
2549-51-1, Vinyl chloroacetate 2551-62-4, Sulfur hexafluoride  
2567-83-1, Tetraethylammonium perchlorate 2657-00-3, Sodium  
2-diazo-1-naphthol-5-sulfonate 2691-41-0,  
Cyclotetramethylenetetranitramine 2696-92-6, Nitrosyl chloride  
2699-79-8, Sulfuryl fluoride 2782-57-2, Dichloroisocyanuric acid  
2782-57-2D, Dichloroisocyanuric acid, salts 2820-51-1, Nicotine  
hydrochloride 2825-15-2 2855-13-2, Isophoronediamine  
2867-47-2, Dimethylaminoethyl methacrylate 2893-78-9, Sodium  
dichloroisocyanurate 2937-50-0, Allyl chloroformate 2941-64-2,  
Ethyl chlorothioformate 2980-64-5 3025-88-5,  
2,5-Dimethyl-2,5-dihydroperoxy hexane 3031-74-1, Ethyl  
hydroperoxide 3032-55-1 3054-95-3, 3,3-Diethoxypropene  
3087-37-4, Tetrapropylorthotitanate 3129-90-6, Isothiocyanic acid  
3129-91-7, Dicyclohexylammonium nitrite 3132-64-7, Epibromohydrin  
3165-93-3, 4-Chloro-o-toluidine hydrochloride 3173-53-3,  
Cyclohexyl isocyanate 3179-56-4, Acetyl cyclohexanesulfonyl  
peroxide 3188-13-4, Chloromethyl ethyl ether 3248-28-0,  
Dipropionyl peroxide 3268-49-3 3275-73-8, Nicotine tartrate  
3282-30-2, Trimethylacetyl chloride 3497-00-5, Phenyl phosphorus  
thiodichloride 3689-24-5 3724-65-0, Crotonic acid 3811-04-9,  
Potassium chlorate 3926-62-3, Sodium chloroacetate 3982-91-0,  
Thiophosphoryl chloride 4016-11-9, 1,2-Epoxy-3-ethoxypropane  
4098-71-9 4109-96-0, Dichlorosilane 4170-30-3, Crotonaldehyde  
4300-97-4 4316-42-1, N-n-Butylimidazole 4419-11-8,  
2,2'-Azodi(2,4-dimethylvaleronitrile) 4421-50-5 4435-53-4,  
Butoxyl 4452-58-8, Sodium percarbonate 4472-06-4,  
Carbonazidodithioic acid 4484-72-4, Dodecyltrichlorosilane  
4528-34-1 4547-70-0 4591-46-2 4682-03-5, Diazodinitrophenol  
4795-29-3, Tetrahydrofurfurylamine 4904-61-4, 1,5,9-  
Cyclododecatriene 5283-66-9, Octyltrichlorosilane 5283-67-0,  
Nonyltrichlorosilane 5329-14-6, Sulfamic acid 5419-55-6,  
Triisopropyl borate 5610-59-3, Silver fulminate 5637-83-2,  
Cyanuric triazide 5653-21-4 5894-60-0, Hexadecyltrichlorosilane  
5970-32-1, Mercury salicylate 6023-29-6 6275-02-1 6423-43-4  
6427-21-0, Methoxymethyl isocyanate 6484-52-2, Nitric acid  
ammonium salt, properties 6484-52-2D, Ammonium nitrate, mixts.  
with fuel oils 6505-86-8, Nicotine sulfate 6659-60-5,

1,2,4-Butanetriol trinitrate 6842-15-5, Propylene tetramer  
 6867-30-7, Lithium acetylide ethylenediamine complex 7304-92-9  
 7332-16-3, Inositol hexanitrate 7429-90-5, Aluminum, miscellaneous  
 7429-90-5D, Aluminum, alkyl derivs. 7439-90-9, Krypton,  
 miscellaneous 7439-92-1D, Lead, compds. 7439-93-2,  
 Lithium, miscellaneous 7439-93-2D, Lithium, alkyl derivs.  
 7439-95-4, Magnesium, miscellaneous 7439-95-4D, Magnesium, alkyl  
 derivs. 7439-97-6, Mercury, miscellaneous 7439-97-6D, Mercury,  
 compds. 7440-01-9, Neon, miscellaneous 7440-09-7, Potassium,  
 miscellaneous 7440-17-7, Rubidium, miscellaneous 7440-21-3,  
 Silicon, miscellaneous 7440-23-5, Sodium, miscellaneous  
 7440-28-0D, Thallium, compds. 7440-29-1, Thorium, miscellaneous  
 7440-31-5D, Tin, org. compds. 7440-32-6, Titanium, properties  
 7440-36-0, Antimony, miscellaneous 7440-36-0D, Antimony, inorg.  
 and org. compds. 7440-37-1, Argon, miscellaneous 7440-38-2,  
 Arsenic, miscellaneous 7440-39-3, Barium, miscellaneous  
 7440-39-3D, Barium, alloys 7440-39-3D, Barium, compds.  
 7440-41-7, Beryllium, miscellaneous 7440-41-7D, Beryllium, compds.  
 7440-43-9D, Cadmium, compds. 7440-44-0, Carbon, miscellaneous  
 7440-45-1, Cerium, miscellaneous 7440-46-2, Cesium, miscellaneous  
 7440-55-3, Gallium, miscellaneous 7440-58-6, Hafnium,  
 miscellaneous 7440-59-7, Helium, miscellaneous 7440-61-1,  
 Uranium, miscellaneous 7440-63-3, Xenon, miscellaneous  
 7440-66-6, Zinc, miscellaneous 7440-67-7, Zirconium, miscellaneous  
 7440-70-2, Calcium, miscellaneous 7440-70-2D, Calcium, alloys  
 7446-09-5, Sulfur dioxide, miscellaneous 7446-11-9, Sulfur  
 trioxide, miscellaneous 7446-14-2, Lead sulfate 7446-18-6,  
 Thallium sulfate 7446-70-0, Aluminum chloride (AlCl<sub>3</sub>),  
 miscellaneous 7487-94-7, Mercuric chloride, miscellaneous  
 7488-56-4, Selenium disulfide 7521-80-4, Butyltrichlorosilane  
 7550-45-0, Titanium tetrachloride, miscellaneous 7570-26-5,  
 1,2-Dinitroethane 7572-29-4, Dichloroacetylene 7578-36-1  
 7580-67-8, Lithium hydride 7601-89-0, Sodium perchlorate  
 7601-90-3, Perchloric acid, miscellaneous 7616-94-6, Perchloryl  
 fluoride 7631-89-2, Sodium arsenate 7631-99-4, Sodium nitrate,  
 miscellaneous 7632-00-0, Sodium nitrite 7632-51-1, Vanadium  
 tetrachloride 7637-07-2, Boron trifluoride, miscellaneous  
 7645-25-2, Lead arsenate 7646-69-7, Sodium hydride  
 RL: ADV (Adverse effect, including toxicity); PEP (Physical,  
 engineering or chemical process); BIOL (Biological study); PROC  
 (Process)

(packaging and transport of, stds. for)

IT 7646-78-8, Stannic chloride, miscellaneous 7646-85-7, Zinc  
 chloride, miscellaneous 7646-93-7, Potassium hydrogen sulfate  
 7647-01-0, Hydrogen chloride, miscellaneous 7647-18-9, Antimony  
 pentachloride 7647-19-0, Phosphorus pentafluoride 7664-38-2,  
 Phosphoric acid, miscellaneous 7664-38-2D, Phosphoric acid, esters  
 7664-39-3, Hydrogen fluoride, miscellaneous 7664-41-7, Ammonia,  
 miscellaneous 7664-93-9, Sulfuric acid, miscellaneous 7681-38-1,  
 Sodium hydrogen sulfate 7681-49-4, Sodium fluoride, miscellaneous  
 7681-52-9, Sodium hypochlorite 7697-37-2, Nitric acid,  
 miscellaneous 7704-34-9, Sulfur, miscellaneous 7705-07-9D,  
 Titanium trichloride, mixts. 7705-08-0, Ferric chloride,  
 miscellaneous 7718-98-1, Vanadium trichloride 7719-09-7, Thionyl  
 chloride 7719-12-2, Phosphorus trichloride 7722-64-7, Potassium  
 permanganate 7722-84-1, Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), miscellaneous  
 7723-14-0, Phosphorus, miscellaneous 7726-95-6, Bromine,  
 miscellaneous 7727-15-3, Aluminum bromide 7727-18-6, Vanadium  
 oxytrichloride 7727-21-1, Potassium persulfate 7727-37-9,  
 Nitrogen, miscellaneous 7727-37-9D, Nitrogen, mixts. with rare



gases 7727-54-0, Ammonium persulfate 7738-94-5, Chromic acid  
 ( $\text{H}_2\text{CrO}_4$ ) 7756-94-7, Triisobutylene 7757-79-1, Potassium nitrate,  
 miscellaneous 7758-01-2, Potassium bromate 7758-09-0, Potassium  
 nitrite 7758-19-2, Sodium chlorite 7758-94-3, Ferrous chloride  
 7761-88-8, Silver nitrate, miscellaneous 7773-03-7, Potassium  
 bisulfite 7775-09-9, Sodium chlorate 7775-14-6, Sodium  
 dithionite 7778-39-4, Arsenic acid 7778-44-1, Calcium arsenate  
 7778-54-3, Calcium hypochlorite 7778-66-7 7778-74-7, Potassium  
 perchlorate 7779-86-4, Zinc dithionite 7779-88-6, Zinc nitrate  
 7782-39-0, Deuterium, miscellaneous 7782-41-4, Fluorine,  
 miscellaneous 7782-44-7, Oxygen, miscellaneous 7782-44-7D,  
 Oxygen, mixts. with rare gases 7782-49-2, Selenium, miscellaneous  
 7782-50-5, Chlorine, miscellaneous 7782-65-2, Germane 7782-78-7,  
 Nitrosylsulfuric acid 7782-79-8D, Hydrazoic acid, copper complexes  
 7782-99-2, Sulfurous acid, miscellaneous 7783-06-4, Hydrogen  
 sulfide, miscellaneous 7783-07-5, Hydrogen selenide ( $\text{H}_2\text{Se}$ )  
 7783-08-6, Selenic acid 7783-33-7 7783-41-7, Oxygen difluoride  
 7783-54-2, Nitrogen trifluoride 7783-56-4, Antimony trifluoride  
 7783-60-0, Sulfur tetrafluoride 7783-61-1, Silicon tetrafluoride  
 7783-66-6, Iodine pentafluoride 7783-70-2, Antimony pentafluoride  
 7783-79-1, Selenium hexafluoride 7783-80-4, Tellurium hexafluoride  
 7783-81-5, Uranium hexafluoride 7783-82-6, Tungsten hexafluoride  
 7783-91-7, Silver chlorite 7784-08-9 7784-21-6, Aluminum hydride  
 7784-30-7, Aluminum phosphate 7784-42-1, Arsine 7784-46-5,  
 Sodium arsenite 7786-30-3D, Magnesium chloride ( $\text{MgCl}_2$ ), mixt. with  
 chlorates 7787-36-2, Barium permanganate 7787-41-9, Barium  
 selenate 7787-71-5, Bromine trifluoride 7788-97-8, Chromic  
 fluoride 7789-09-5, Ammonium dichromate 7789-18-6, Cesium  
 nitrate 7789-21-1, Fluorosulfonic acid 7789-23-3, Potassium  
 fluoride 7789-29-9, Potassium bifluoride 7789-30-2, Bromine  
 pentafluoride 7789-38-0, Sodium bromate 7789-59-5, Phosphorus  
 oxybromide 7789-60-8, Phosphorus tribromide 7789-61-9, Antimony  
 tribromide 7789-69-7, Phosphorus pentabromide 7789-78-8, Calcium  
 hydride 7790-59-2 7790-69-4, Lithium nitrate  
 7790-91-2, Chlorine trifluoride 7790-93-4, Chloric acid  
 7790-94-5, Chlorosulfonic acid 7790-98-9, Ammonium perchlorate  
 7790-99-0, Iodine monochloride 7791-10-8, Strontium chlorate  
 7791-23-3, Selenium oxychloride 7791-25-5, Sulfuryl chloride  
 7791-27-7, Disulfuryl chloride 7803-51-2, Phosphine 7803-52-3,  
 Stibine 7803-54-5, Magnesium diamide 7803-55-6, Ammonium  
 metavanadate 7803-57-8, Hydrazine hydrate 7803-62-5, Silane,  
 miscellaneous 7803-63-6, Ammonium hydrogen sulfate 8004-09-9  
 8006-19-7, Amatol 8006-28-8, Soda lime 8007-56-5,  
 Nitrohydrochloric acid 8007-58-7 8012-74-6, London Purple  
 8014-95-7, Fuming sulfuric acid 8049-17-0, Ferrosilicon  
 8050-88-2, Celluloid 8063-77-2 8065-53-0, Hexolite 8066-33-9,  
 Pentolite 8070-50-6 9003-53-6, Polystyrene 9004-70-0,  
 Collodion 9056-38-6, Nitrostarch 9080-17-5, Ammonium polysulfide  
 10022-31-8, Barium nitrate 10024-97-2, Nitrogen oxide ( $\text{N}_2\text{O}$ ),  
 properties 10025-78-2, Trichlorosilane 10025-85-1, Nitrogen  
 trichloride 10025-87-3, Phosphorus oxychloride 10025-91-9,  
 Antimony trichloride 10026-04-7, Silicon tetrachloride  
 10026-11-6, Zirconium tetrachloride 10026-13-8, Phosphorus  
 pentachloride 10031-13-7 10031-87-5, 2-Ethylbutyl acetate  
 10034-81-8, Magnesium perchlorate 10034-85-2, Hydrogen iodide  
 10035-10-6, Hydrogen bromide, miscellaneous 10039-54-0,  
 Hydroxylamine sulfate 10042-76-9, Strontium nitrate 10045-94-0,  
 Mercuric nitrate 10049-04-4, Chlorine dioxide 10099-74-8, Lead  
 nitrate 10101-50-5 10102-06-4, Uranyl nitrate 10102-12-2,  
 Selenium nitride 10102-18-8, Sodium selenite 10102-43-9, Nitric

oxide, miscellaneous 10102-44-0, Nitrogen dioxide, miscellaneous  
 10102-49-5, Ferric arsenate 10102-50-8, Ferrous arsenate  
 10103-50-1, Magnesium arsenate 10118-76-0 10124-37-5, Calcium  
 nitrate 10124-48-8, Mercury ammonium chloride 10124-50-2,  
 Potassium arsenite 10137-74-3, Calcium chlorate 10192-29-7,  
 Ammonium chlorate 10241-05-1, Molybdenum pentachloride  
 10256-53-8, Methanamine, compd. with trinitromethane, miscellaneous  
 10294-33-4, Boron tribromide 10294-34-5, Boron trichloride  
 10306-83-9 10326-21-3, Magnesium chlorate 10326-24-6  
 10361-95-2, Zinc chlorate 10377-60-3, Magnesium nitrate  
 10377-66-9, Manganese nitrate 10415-75-5, Mercurous nitrate  
 10421-48-4, Ferric nitrate 10431-47-7 10544-63-5, Ethyl  
 crotonate 11069-19-5, Dichlorobutene 11071-47-9, Isooctene  
 11099-22-2 11105-16-1, Zirconium hydride 11122-26-2 11135-81-2  
 11138-49-1, Sodium aluminate 11140-68-4, Titanium hydride  
 12001-29-5, Chrysotile 12002-19-6, Mercury nucleate 12002-48-1,  
 Trichlorobenzene 12030-88-5, Potassium superoxide 12031-80-0,  
 Lithium peroxide 12033-49-7, Nitrogen trioxide 12034-12-7,  
 Sodium superoxide 12057-74-8, Magnesium phosphide (Mg<sub>3</sub>P<sub>2</sub>)  
 12125-01-8, Ammonium fluoride 12135-76-1, Ammonium sulfide  
 12136-15-1, Mercury nitride 12164-94-2, Ammonium azide  
 12167-20-3, Nitrocresol 12172-67-7, Actinolite 12401-70-6,  
 Potassium monoxide 12401-86-4, Sodium monoxide 12427-38-2, Maneb  
 12440-42-5, Tin phosphide (Sn<sub>3</sub>P<sub>4</sub>) 12504-16-4, Strontium phosphide  
 (Sr<sub>3</sub>P<sub>2</sub>) 12627-52-0, Antimony sulfide 12627-52-0D, Antimony  
 sulfide, mixt. with chlorates 12640-89-0, Selenium oxide  
 12653-71-3, Mercury oxide 12737-18-7, Calcium silicide  
 12751-03-0, Cordite 12771-08-3, Sulfur chloride 12789-46-7, Amyl  
 acid phosphate 13092-75-6, Silver acetylde 13138-45-9  
 13225-10-0, α-Methylglucoside tetranitrate 13319-75-0, Boron  
 trifluoride dihydrate 13410-01-0, Sodium selenate 13424-46-9,  
 Lead azide 13426-91-0, Cupriethylenediamine 13437-80-4, Mercuric  
 arsenate 13444-85-4, Nitrogen triiodide 13446-10-1, Ammonium  
 permanganate 13446-48-5, Ammonium nitrite 13450-97-0, Strontium  
 perchlorate 13453-30-0, Thallium chlorate 13463-39-3, Nickel  
 carbonyl 13463-40-6, Iron pentacarbonyl 13464-33-0, Zinc  
 arsenate 13464-58-9D, Arsenous acid, copper complexes  
 13465-73-1, Bromosilane 13465-95-7, Barium perchlorate  
 13472-08-7 13473-90-0, Aluminum nitrate  
 RL: ADV (Adverse effect, including toxicity); PEP (Physical,  
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IT 13477-00-4, Barium chlorate 13477-10-6, Barium hypochlorite  
 13477-36-6, Calcium perchlorate 13520-83-7, Uranyl nitrate  
 hexahydrate 13537-32-1, Fluorophosphoric acid 13548-38-4,  
 Chromium nitrate 13597-54-1, Zinc selenate 13597-99-4, Beryllium  
 nitrate 13598-36-2, Phosphonic acid 13637-63-3, Chlorine  
 pentafluoride 13637-76-8, Lead perchlorate 13718-59-7  
 13746-89-9, Zirconium nitrate 13762-51-1, Potassium borohydride  
 13766-44-4, Mercury sulfate 13769-43-2, Potassium metavanadate  
 13770-96-2, Sodium aluminum hydride 13774-25-9 13779-41-4,  
 Difluorophosphoric acid 13780-03-5, Calcium bisulfite  
 13823-29-5, Thorium nitrate 13840-33-0, Lithium  
 hypochlorite 13840-33-0D, Lithium hypochlorite, mixts.  
 13843-59-9, Ammonium bromate 13863-88-2, Silver azide  
 13967-90-3, Barium bromate 13973-87-0, Bromine azide 13973-88-1,  
 Chlorine azide 13987-01-4, Tripropylene 14014-86-9 14019-91-1,  
 Calcium selenate 14293-73-3 14448-38-5, Hyponitrous acid  
 14519-07-4, Zinc bromate 14519-17-6, Magnesium bromate

14546-44-2, Hydrazine azide 14567-73-8, Tremolite 14644-61-2,  
Zirconium sulfate 14666-78-5, Diethylperoxydicarbonate  
14674-72-7, Calcium chlorite 14696-82-3, Iodine azide (I(N3))  
14977-61-8 15195-06-9 15245-44-0, Lead trinitroresorcinate  
15347-57-6, Lead acetate 15457-98-4 15512-36-4, Calcium  
dithionite 15545-97-8, 2,2'-Azodi(2,4-dimethyl-4-  
methoxyvaleronitile) 15598-34-2, Pyridine perchlorate  
15718-71-5, Ethylenediamine diperchlorate 15825-70-4, Mannitol  
hexanitate 15875-44-2, Methylamine perchlorate 16215-49-9,  
Di-n-butyl peroxydicarbonate 16229-43-9, Vanadyl sulfate  
16339-86-9 16646-35-8 16721-80-5, Sodium hydrosulfide  
16753-36-9, Copper acetylde 16853-85-3, Lithium aluminum hydride  
16871-71-9, Zinc fluorosilicate 16871-90-2, Potassium  
fluorosilicate 16872-11-0 16893-85-9, Sodium fluorosilicate  
16901-76-1, Thallium nitrate 16919-19-0, Ammonium fluorosilicate  
16940-66-2, Sodium borohydride 16940-81-1, Hexafluorophosphoric  
acid 16941-12-1, Chloroplatinic acid 16949-15-8, Lithium  
borohydride 16949-65-8, Magnesium fluorosilicate 16961-83-4,  
Fluorosilicic acid 16962-07-5, Aluminum borohydride 17014-71-0,  
Potassium peroxide 17068-78-9, Anthophyllite 17462-58-7,  
sec-Butyl chloroformate 17639-93-9, Methyl-2-chloropropionate  
17702-41-9, Decaborane 17861-62-0 18130-44-4, Titanium sulfate  
18414-36-3 18810-58-7, Barium azide 19159-68-3 19287-45-7,  
Diborane 19287-45-7D, Diborane, mixts. 19624-22-7, Pentaborane  
20062-22-0 20236-55-9, Barium styphnate 20600-96-8 20816-12-0,  
Osmium tetroxide 20820-44-4 20859-73-8, Aluminum phosphide  
21351-79-1, Cesium hydroxide (Cs(OH)) 21569-01-7 21723-86-4  
21985-87-5, Pentanitroaniline 22128-62-7,  
Chloromethylchloroformate 22750-93-2, Ethyl perchlorate  
22751-24-2 22826-61-5 23414-72-4, Zinc permanganate  
23745-86-0, Potassium fluoroacetate 24167-76-8, Sodium phosphide  
24468-13-1, 2-Ethylhexylchloroformate 24884-69-3 25013-15-4,  
Vinyl toluene 25109-57-3 25134-21-8 25136-55-4,  
Dimethyldioxane 25154-42-1, Chlorobutane 25154-54-5,  
Dinitrobenzene 25155-15-1, Cymene 25167-20-8, Tetrabromoethane  
25167-67-3, Butylene 25167-70-8, Diisobutylene 25167-80-0,  
Chlorophenol 25168-05-2, Chlorotoluene 25265-68-3,  
Methyltetrahydrofuran 25321-14-6, Dinitrotoluene 25322-01-4,  
Nitropropane 25322-20-7, Tetrachloroethane 25323-30-2,  
Dichloroethylene 25339-56-4, Heptene 25340-17-4, Diethylbenzene  
25377-72-4, n-Amylene 25496-08-6, Fluorotoluene 25497-28-3,  
Difluoroethane 25497-29-4, Chlorodifluoroethane 25513-64-8  
25550-53-2 25550-55-4, Dinitrosobenzene 25550-58-7,  
Dinitrophenol 25550-58-7D, Dinitrophenol, salts 25567-67-3,  
Chlorodinitrobenzene 25567-68-4, Chloronitrotoluene 25639-42-3,  
Methylcyclohexanol 25721-38-4, Lead picrate 25917-35-5, Hexanol  
26134-62-3, Lithium nitride 26140-60-3D, Terphenyl, halo derivs.  
26249-12-7, Dibromobenzene 26471-56-7, Dinitroaniline  
26471-62-5, Toluene diisocyanate 26506-47-8, Copper chlorate  
26571-79-9 26618-70-2 26628-22-8, Sodium azide 26638-19-7,  
Dichloropropane 26645-10-3 26760-64-5, Isopentene 26762-93-6  
26914-02-3, Iodopropane 26915-12-8, Toluidine 26952-23-8,  
Dichloropropene 26952-42-1, Trinitroaniline 27134-26-5,  
Chloroaniline 27134-27-6, Dichloroaniline 27137-85-5,  
Dichlorophenyltrichlorosilane 27152-57-4 27176-87-0,  
Dodecylbenzenesulfonic acid 27195-67-1, Dimethylcyclohexane  
27215-10-7 27236-46-0, Isohexene 27254-36-0, Nitronaphthalene  
27458-20-4, Butyltoluene 27978-54-7, Hydrazine perchlorate  
27986-95-4 27987-06-0, Trifluoroethane 28260-61-9,  
Trinitrochlorobenzene 28300-74-5, Antimony potassium tartrate



28324-52-9, Pinane hydroperoxide 28479-22-3 28653-16-9  
28679-16-5, Trimethylhexamethylenediisocyanate 28805-86-9,  
Butylphenol 29191-52-4, Anisidine 29306-57-8 29790-52-1,  
Nicotine salicylate 29903-04-6 29965-97-7, Cyclooctadiene  
30236-29-4, Sucrose octanitate 30525-89-4, Paraformaldehyde  
30553-04-9, Naphthylthiourea 30586-10-8, Dichloropentane  
30586-18-6, Pentamethylheptane 31058-64-7 31212-28-9,  
Nitrobenzenesulfonic acid 33453-96-2 33864-17-4 34216-34-7,  
Trimethylcyclohexylamine 35296-72-1, Butanol 35860-50-5,  
Trinitrobenzoic acid 35860-51-6, Dinitroresorcinol 35884-77-6,  
Xylyl bromide 36472-34-1, Chloropropene 37020-93-2, Mercury  
cyanide (Hg(CN)) 37187-22-7, Acetyl acetone peroxide 37206-20-5,  
Methyl isobutyl ketone peroxide 37273-91-9, Metaldehyde  
37320-91-5, Mercury iodide 37368-10-8, Aluminum vanadium oxide  
38139-71-8, Bromide chloride 38232-63-2, Mercurous azide  
38483-28-2, Methylene glycol dinitrate 39377-49-6, Copper cyanide  
39377-56-5, Lead sulfide 39404-03-0, Magnesium silicide  
39409-64-8, TVOPA 39432-81-0 39455-80-6, Ammonium sodium  
vanadium oxide 40058-87-5, Isopropyl-2-chloropropionate  
41195-19-1 41587-36-4, Chloronitroaniline 42296-74-2, Hexadiene  
43133-95-5, Methylpentane 50815-73-1 50874-93-6 51006-59-8  
51023-22-4, Trichlorobutene 51064-12-1 51312-23-3, Mercury  
bromide 51317-24-9, Lead nitroresorcinate 51325-42-9, Copper  
selenite 51845-86-4, Ethyl borate 52181-51-8 53014-37-2,  
Tetranitroaniline 53408-91-6, Mercury thiocyanate 53422-49-4  
53569-62-3 53839-08-0 53906-68-6 54141-09-2, 1,4,-Butynediol  
54413-15-9, Tritonal 54727-89-8 54958-71-3 55510-04-8,  
Dinitroglycoluril 55810-17-8

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